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December 16, 2014
Serial No: MNS-14-103

10 CFR 50.54(q)

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Subject: Duke Energy Carolinas, LLC
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369, 50-370
Emergency Plan, Revision 14-5

Please find attached Revision 14-5 to the McGuire Nuclear Station Emergency Plan. This revision is submitted in accordance with the requirements of 10 CFR 50.54(q) and does not result in a reduction in the effectiveness of the Emergency Plan or the Emergency Plan Implementing Procedures.

Questions regarding this submittal should be directed to Kay Crane, McGuire Regulatory Affairs, at (980) 875-4306.

Jimmy Glenn
for

Steven D. Capps

Attachments

AX45
NRR

(Two Copies)
cc: Mr. V.M. McCree, Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

(One Copy)
Catherine Haney, Director
Office of Nuclear Material Safety and Safeguards
Mail Stop 14 A12
Washington, D. C. 20555-0001

(w/o attachments)

Mr. G.E. Miller
NRC Project Manager (McGuire)
U. S. Nuclear Regulatory Commission
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Mr. John Zeiler
NRC Senior Resident Inspector
McGuire Nuclear Station

DUKE ENERGY

McGUIRE NUCLEAR SITE

EMERGENCY PLAN

APPROVED: Jimmy Glenn for Steven Capps

SITE VICE PRESIDENT

DATE APPROVED: 12/16/14

REVISION 14-5: December, 2014

EFFECTIVE DATE: December, 2014

ORIGINAL DATE: August 25, 1980

December 10, 2014

MEMORANDUM

To: All Holders of the McGuire Emergency Plan

Subject: McGuire Emergency Plan

Enclosed please find Revision 14-5 to the McGuire Nuclear Site Emergency Plan. Refer to Attachment 1 to complete the revision to the manual.

If there are any questions, please call me at 980-875-4672.

Sincerely,

Kevin Murray
Emergency Preparedness Manager
McGuire Nuclear Station

KLM/jcm

Attachment: Emergency Plan Revision

cc: EP File 1502

eprevltr.doc

SECTION	REMOVE PAGES	INSERT PAGES
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DUKE ENERGY COMPANY
McGUIRE NUCLEAR SITE
EMERGENCY PLAN
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MCGUIRE NUCLEAR SITE
EMERGENCY PLAN

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D. EMERGENCY CLASSIFICATION SYSTEM

Regulatory Guide 1.101, Rev. 3, August 1992, approved the guidance provided by NUMARC/NESP-007, Revision 2, as an alternative methodology for the development of Emergency Action Levels. McGuire Nuclear Site used the NUMARC guidance for the development of initiating conditions and emergency action levels. The emergency action levels provided in this section have been modified to implement the guidance provided in NRC Bulletin 2005-02, NEI guidance as endorsed in Regulatory Issue Summary 2006-12 and to support the implementation of NEI 03-12.

The emergency classification system utilizes four categories for classification of emergency events.

D.1.a UNUSUAL EVENT

Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

The purpose of this class is to provide notification of the emergency to the station staff, State and Local Government representatives, and the NRC.

Specific initiating conditions and their corresponding emergency action levels are provided in this Basis Document.

D.1.b ALERT

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

The purpose of this class is to assure that emergency personnel are readily available to:

1. Activate the onsite response centers.

2. Respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required.

3. Provide offsite authorities current status information.

Specific initiating conditions and their corresponding emergency action levels are provided in this Basis Document.

D.I.c. SITE AREA EMERGENCY

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

The purpose of the Site Area Emergency is to:

1. Activate the offsite response centers.

2. Assure that monitoring teams are mobilized.

3. Assure that personnel required for taking protective actions of near site areas are at duty stations should the situation become more serious.

4. Provide current information to the public and be available for consultation with offsite authorities.

Specific initiating conditions and their corresponding emergency action levels are provided in this Basis Document.

D.I.d. GENERAL EMERGENCY

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

The purpose of the General Emergency is to:

1. Initiate predetermined protective actions for the public.

2. Provide continuous assessment of information from onsite and offsite measurements.

3. Initiate additional measures as indicated by event releases or potential releases.

4. Provide current information to the public and be available for consultation with offsite authorities.

Specific initiating conditions and their corresponding emergency action levels are provided in this Basis Document.

D.2. INITIATING CONDITIONS

The initiating conditions and their corresponding emergency action levels are contained in the Basis Document beginning on page D6. Classification procedure (RP/0/A/5700/000) provides the guidance necessary to classify events and promptly declare the appropriate emergency conditions within 15 minutes after the availability of indications to cognizant facility staff that an emergency action level threshold has been exceeded. Specific response procedures are in place which delineate the required response during the appropriate classification.

D.3. ALPHABETICAL LIST OF IMPORTANT DEFINED TERMS FOR EVENT CLASSIFICATION {5}

ALL - (As relates to Operating Mode Applicability) – At all times.

BOMB - Refers to a explosive device suspected of having sufficient force to damage plant systems or structures.

CIVIL DISTURBANCE - A group of ten (10) or more people violently protesting station operations or activities at the site. A civil disturbance is considered to be violent when force has been used in an attempt to injure site personnel or damage plant property.

COGNIZANT FACILITY STAFF - Any member of facility staff, who by virtue of training and experience, is qualified to assess the indications or reports for validity and to compare the same to the EALs in the licensee's emergency classification scheme. (Does not include staff whose positions require they report, rather than assess, abnormal conditions to the facility.)

CONFINEMENT BOUNDARY - The barrier(s) between areas containing radioactive substances and the environment.

EXPLOSION - A rapid, violent unconfined combustion, or a catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems or components.

EXTORTION - An attempt to cause an action at the site by threat of force.

FIRE - Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flames is preferred but is NOT required if large quantities of smoke and heat are observed. An electrical breaker flash that creates high temperatures for a short duration and merely localized scorching to that breaker and its compartment should not be considered a fire.

HOSTAGE - A person(s) held as leverage against the station to ensure demands will be met by the station.

HOSTILE ACTION - An act toward a NPP or its personnel that includes the use of violent force to destroy equipment, take **HOSTAGES**, and / or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, **PROJECTILEs**, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs

should be used to address such activities, (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE - One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT - Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where **IMMINENT** time frames are specified, they shall apply.

INABILITY TO DIRECTLY MONITOR - Operational Aid Computer data points are unavailable or gauges/panel indications are not readily available to the operator.

INTRUSION - A person(s) present in a specified area without authorization. Discovery of a **BOMB** in a specified area is indication of **INTRUSION** into that area by a **HOSTILE FORCE**.

ISFSI - Independent Spent Fuel Storage Installation.

NO MODE - Defueled.

PROJECTILE - An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

PROLONGED - a duration beyond normal limits, defined as "greater than 15 minutes" or as determined by the judgement of the Emergency Coordinator.

PROTECTED AREA - Typically the site specific area which normally encompasses all controlled areas within the security **PROTECTED AREA** fence.

REACTOR COOLANT SYSTEM (RCS/NCS) LEAKAGE – RCS Operational Leakage as defined in the Technical Specification Basis B 3.4.13.

RUPTURED - (As relates to Steam Generator) - Existence of primary to secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

SABOTAGE - Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of **SABOTAGE** until this determination is made by security supervision.

SECURITY CONDITION - Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A **SECURITY CONDITIO**N does not involve a **HOSTILE ACTION**.

SIGNIFICANT TRANSIENT- An unplanned event involving one or more of the following: (I) automatic turbine runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load; (3) reactor trip, (4) safety injection, (5) thermal power oscillations ≥10%.

SITE BOUNDARY - That area, including the protected area, in which Duke Power Company has the authority to control all activities, including exclusion or removal of personnel and property.

SLC - Selected Licensee Commitments.

SUSTAINED - A duration of time long enough to confirm that the CSF is valid (not momentary).
TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) - The sum of external dose exposure to a radioactive plume, to radionuclides deposited on the ground by the plume, and the internal exposure from inhaled radionuclides deposited in the body.

TOXIC GAS - A gas that is dangerous to life or health by reason of inhalation or skin contact (e.g. chlorine).

UNCONTROLLED - Event is not the result of planned actions by the plant staff.

UNPLANNED - An event or action is UNPLANNED if it is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are UNPLANNED.

VALID - An indication or report or condition is considered to be VALID when it is conclusively verified by: (l) an instrument channel check, or (2) indications on related or redundant instrumentation, or (3) by direct observation by plant personnel such that doubt related to the instrument's operability, the condition's existence or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

VIOLENT - Force has been used in an attempt to injure site personnel or damage plant property.

VISIBLE DAMAGE - Damage to equipment or structure that is readily observable without measurements, testing, or analyses. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering.

VITAL AREA - Areas within the PROTECTED AREA that house equipment important for nuclear safety. Access to a VITAL AREA is allowed only if an individual has been authorized to be in that area per the Security plan, therefore VITAL AREA is a Security term.

Enclosure 4.1
FISSION PRODUCT BARRIER MATRIX

Use EALs to determine Fission Product Barrier status (Intact, Potential Loss, or Loss). Add points for all 3 barriers. Classify according to the table on page D7.

Note 1: This table is only applicable in Modes 1-4.

Note 2: Also, an event (or multiple events) could occur which results in the conclusion that exceeding the Loss or Potential Loss thresholds is **imminent** (i.e., within 1-3 hours). In this **imminent** loss situation, use judgement and classify as if the thresholds are exceeded.

Note 3: When determining Fission Product Barrier status, the Fuel Clad Barrier should be considered to be lost, or potentially lost, if the conditions for the Fuel Clad Barrier loss or potential loss EALs were met previously (**validated** and **sustained**) during the event, even if the conditions do not currently exist.

Note 4: Critical Safety Function (CSF) indications are not meant to include transient alarm conditions which may appear during the start-up of engineered safeguards equipment. A CSF condition is satisfied when the alarmed state is **valid** and **sustained**. The STA should be consulted to affirm if any CSF has been **validated** and an appropriate function restoration procedure implemented prior to that CSF being used as the basis to classify an emergency. {1}

EAL #	Unusual Event	EAL #	Alert	EAL #	Site Area Emergency	EAL #	General Emergency
4.1.U.1	Potential Loss of Containment	4.1.A.1	Loss **OR** Potential Loss of Nuclear Coolant System	4.1.S.1	Loss **OR** Potential Loss of Both Nuclear Coolant System **AND** Fuel Clad	4.1.G.1	Loss of All Three Barriers
4.1.U.2	Loss of Containment	4.1.A.2	Loss **OR** Potential Loss of Fuel Clad	4.1.S.2	Loss **AND** Potential Loss Combinations of Both Nuclear Coolant System **AND** Fuel Clad	4.1.G.2	Loss of Any Two Barriers **AND** Potential Loss of the Third
		4.1.A.3	Potential Loss of Containment **AND** Loss **OR** Potential Loss of Any Other Barrier	4.1.S.3	Loss of Containment **AND** Loss **OR** Potential Loss of Any Other Barrier		

Enclosure 4.1
FISSION PRODUCT BARRIER MATRIX

NOTE: If a barrier is affected, it has a single point value based on a "potential loss" or a "loss". "Not Applicable" is included in the matrix as a place holder only, and has no point value assigned.

Barrier	Points (1-5)	Potential Loss (X)	Loss (X)	Total Points	Classification
Containment		1	3	1 – 3	Unusual Event
NCS		4	5	4 – 6	Alert
Fuel Clad		4	5	7 – 10	Site Area Emergency
Total Points				11 - 13	General Emergency

1. Compare plant conditions against the Fission Product Barrier Matrix on page D8.
2. Determine the "potential loss" or "loss" status for each barrier (Containment, NCS and Fuel Clad) based on the EAL symptom description.
3. For each barrier, write the highest single point value applicable for the barrier in the "Points" column and mark the appropriate "potential loss" **OR** "loss" column.
4. Add the points in the "Points" column and record the sum as "Total Points".
5. Determine the classification level based on the number of "Total Points".
6. In the table on page D6, under one of the four "classification" columns, select the event (e.g. 4.1.A.1 for Loss of Nuclear Coolant System) that best fits the loss of barrier description.
7. Using that EAL number (e.g. 4.1.A.1) select the preprinted notification form **OR** a blank form and complete the required information for Emergency Coordinator/EOF Director approval and transmittal.

4.1.C CONTAINMENT BARRIER

POTENTIAL LOSS - (1 Point)	LOSS - (3 Points)
1. Critical Safety Function Status	
• Containment-RED. • Core cooling - RED path is indicated for > 15 min.	• Not applicable.
2. Containment Conditions.	
• Containment Pressure > 15 PSIG. • H2 concentration > 9% . • Containment pressure greater than 3 psig with either a failure of both trains of NS **OR** a failure of both trains of VX-CARF	• Rapid unexplained decrease in containment pressure following initial increase. • Containment pressure or sump level response not consistent with LOCA conditions.
3. Containment Isolation Valves Status After Containment Isolation Actuation	
• Not applicable.	• Containment isolation is incomplete and a release path from containment exists.
4. SG Secondary Side Release With Primary-to-Secondary Leakage	
• Not applicable.	• Release of secondary side to the environment with primary to secondary leakage GREATER THAN Tech Spec allowable.
5. Significant Radioactive Inventory In Containment	
• Containment Rad. Monitor EMF51A or 51B Reading @ time since shutdown: > 390 R/hr @ 0 - 0.5 hr > 170 R/hr @ 0.5 - 2 hr > 125 R/hr @ 2 - 4 hr > 90 R/hr @ 4 - 8 hr > 53 R/hr @ > 8 hr.	• Not applicable.
6. Emergency Coordinator /EOF Director Judgement	
• Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator/EOF Director indicates **LOSS** or **POTENTIAL LOSS** of the containment barrier.	

4.1.N NCS BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)
1. Critical Safety Function Status	
• NCS Integrity-RED. • Heat Sink-RED.	• Not applicable.
2. NCS Leak Rate	
• Unisolable leak exceeding the capacity of one charging pump in the normal charging mode with letdown isolated.	• GREATER THAN available makeup capacity as indicated by a loss of NCS subcooling.
3. SG Tube Rupture	
• Primary-to-Secondary leak rate exceeds the capacity of one charging pump in the normal charging mode with letdown isolated.	• Indication that a SG is Ruptured and has a Non-Isolable secondary line fault . • Indication that a SG is ruptured and a prolonged release of contaminated secondary coolant is occurring from the affected SG to the environment.
4. Containment Radiation Monitoring	
• Not applicable.	• Not applicable.
5. Emergency Coordinator/EOF Director Judgement	
• Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator /EOF Director indicates **LOSS** or **POTENTIAL LOSS** of the NCS barrier.	

4.1.F FUEL CLAD BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)
1. Critical Safety Function Status	
• Core Cooling-ORANGE. • Heat Sink-RED.	• Core Cooling-RED.
2. Primary Coolant Activity Level	
• Not applicable.	• Coolant Activity GREATER THAN 300 µCi/cc Dose Equivalent Iodine (DEI) I-131.
3. Containment Radiation Monitoring	
• Not applicable.	• Containment radiation monitor 51 A or 51 B reading at time since shutdown; 0-0.5 hrs. > 99 R/hr 0.5 -2 hrs > 43R/hr 2-4 hrs > 31 R/hr 4-8 hrs > 22 R/hr >8 hrs > 13 R/hr
4. Emergency Coordinator/EOF Director Judgement	
• Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator/EOF Director indicates **LOSS** or **POTENTIAL LOSS** of the fuel clad barrier.	

ENCLOSURE 4.1
BASIS INFORMATION FOR
FISSION PRODUCT BARRIER REFERENCE TABLE

CONTAINMENT BARRIER EALs:

The Containment Barrier includes the containment building, its connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

Critical Safety Function (CSF) indications are not meant to include transient alarm conditions which may appear during the start-up of engineered safeguards equipment. A CSF condition is satisfied when the alarmed state is valid and sustained.

4.1.C.1 Critical Safety Function Status

- Containment - RED indicates containment conditions which may challenge the containment integrity. Therefore, this condition represents a potential loss of the containment barrier.

- Core Cooling - RED for greater than 15 minutes in this potential loss EAL represents imminent core damage that, if not terminated, could lead to reactor vessel failure and an increased potential for containment failure. The potential for containment challenge as a result of events at reactor vessel failure makes it prudent to consider an unmitigated core damage condition as a potential loss of the containment barrier.

  Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Coordinator/EOF Director should make the declaration as soon as it is determined that the procedures have been, or will be, ineffective.

- There is no "Loss" EAL associated with this item.

4.1.C.2 Containment Conditions

- Containment pressure above 15 psig (the design pressure) indicates that the containment or its heat removal systems are not functioning as intended. This degradation of containment pressure control represents a potential loss of containment integrity.

- A containment hydrogen concentration of 9 volume percent is sufficient to expect that any ignition would result in complete combustion of the hydrogen in containment and a significant pressure rise. At some initial containment pressures, this pressure rise may exceed the capacity of the containment. Therefore, this level of hydrogen in the containment represents a potential loss of containment integrity.

- Once the Residual Heat Removal system is taking suction from the containment sump, with containment pressure greater than 3 psig and procedural guidance, one train of containment spray is manually aligned to the containment sump. If unable to place one NS train in service or without an operating train of VX-CARF (the CARF with a 10-minute delay) a potential loss of containment exists. At this point a significant portion of the ice in the ice condenser would have melted and the NS system would be needed for containment pressure control.

  This EAL for a potential loss of containment applies after automatic or manual alignment of the containment spray system has been attempted with containment pressure greater than 3 psig and less than one full train of NS is operating.

  This EAL for a potential loss of containment also applies if containment pressure is greater than 3 psig and at least one train of VX-CARF is not operating after a 10 minute delay. Without a single train of VX-CARF in service following actuation, the potential loss should be credited regardless of whether ECCS is in injection or sump recirculation mode.

- Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity.

- Containment pressure and sump levels should increase as a result of the mass and energy release into containment from a Loss of Coolant Accident (LOCA). Thus, sump level or containment pressure not increasing indicates an interfacing systems LOCA which is a containment bypass and a loss of containment integrity, or some other containment pressure boundary failure.

4.1.C.3 Containment Isolation Valve Status After Containment Isolation Actuation

- There is no "Potential Loss" EAL associated with this item.

- Failure to isolate those containment pathways which would allow containment atmosphere to be released from containment is a loss of the containment barrier. (Containment Isolation Valve(s) not closed AND downstream pathway to the environment exists after Containment Isolation Signal.) PIP G 08-00333

4.1.C.4 Steam Generator (SG) Secondary Side Release With Primary To Secondary Leakage

- There is no "Potential Loss" EAL associated with this item.

- Secondary side releases to the environment include those from the condenser air ejectors, CA turbine exhaust, SG Power Operated Relief Valves (PORVs), atmospheric dump valves, faulted steam lines, and main steam safety valves. Steam releases, in combination with primary to secondary leakage, constitute a bypass of the containment and, therefore, a loss of the containment barrier. The appropriate classification can be determined in combination with the SG Tube Rupture EAL under the Reactor Coolant System (NCS) barrier.

4.1.C.5 Significant Radioactive Inventory in Containment

NOTE: If EMF-51A and EMF-51B are unavailable, readings can be calculated from procedure HP/0/B/1009/02, "Alternative Method for Determining Dose Rates within the Reactor Building."

- These values indicate significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of NCS Barriers. NUREG-1228, *Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents*, indicates that such conditions do not exist when the amount of clad damage is less than 20%. This amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment.

  By treating the radioactive inventory in containment as a potential loss, a General Emergency will be declared when the conditions of the fuel clad and NCS barriers are included in the evaluation. This will allow the appropriate protective actions to be recommended.
- There is no "Loss" EAL associated with this item.

4.1.C.6 Emergency Coordinator/EOF Director Judgement

- This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgement that the barrier may be considered lost or potentially lost.

REACTOR COOLANT SYSTEM (NCS) BARRIER EALs:

The NCS Barrier includes the NCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

4.1.N.1 Critical Safety Function Status

- NCS Integrity - RED indicates NCS pressure and temperature conditions which may challenge the Reactor Vessel integrity. Heat Sink - RED indicates the ultimate heat sink function is under extreme challenge. Either of these conditions indicate a potential loss of the NCS Barrier.

- There is no "Loss" EAL associated with this item.

4.1.N.2 NCS Leak Rate

- Small leaks may result in the inability to maintain normal liquid inventory within the NCS by operation of the Chemical and Volume Control System, which is considered as one centrifugal charging pump discharging to the charging header with the letdown line isolated. If letdown cannot be isolated, and a second charging pump is required, this is still considered a potential loss of the NCS barrier. The need for compensatory action to maintain normal liquid inventory is an indication of a degraded NCS barrier and is considered to be a potential loss of the barrier.

- The loss of subcooling is the fundamental indication that the inventory loss from the primary system exceeds the capacity of the inventory control systems. If the loss of subcooling is indicated, the NCS barrier is considered lost.

4.1.N.3 SG Tube Rupture

- Small Steam Generator tube leaks may result in the inability to maintain normal liquid inventory within the Reactor Coolant System (NCS) by operation of the Chemical and Volume Control System, which is considered as one centrifugal charging pump discharging to the charging header with the letdown line isolated. If letdown cannot be isolated, and a second charging pump is required, this is still considered a potential loss of the NCS barrier. The need for compensatory action to maintain normal liquid inventory is an indication of a degraded NCS barrier and is considered to be a potential loss of the barrier.

- A tube rupture with an unisolable secondary line fault is generally indicated by a reduction in primary coolant inventory, increased secondary radiation levels, and an uncontrolled or complete depressurization of the ruptured SG. This set of conditions represents a loss of the NCS and containment fission product barriers. In conjunction with containment barrier loss #4, this condition will result in the

declaration of a Site Area Emergency. Escalation to a General Emergency would be indicated by at least a potential loss of the fuel clad barrier.

- Secondary radiation increases should be observed via radiation monitoring of Condenser Air Ejector Discharge, SG Blowdown, Main Steam, and/or SG Sampling System. Determination of the "uncontrolled" depressurization of the ruptured SG should be based on indication that the pressure decrease in the ruptured steam generator is not a function of operator action. This should prevent declaration based on a depressurization that results from an EOP induced cooldown of the NCS that does not involve the prolonged release of contaminated secondary coolant from the affected SG to the environment. This EAL should encompass steam breaks, feed breaks, and stuck open safety or relief valves. These conditions represents a loss of the NCS and containment fission product barriers.

4.1.N.4 Containment Radiation Monitoring

- This EAL has been deleted for the following reasons. The containment process radiation monitors (EMF-38, 39, and 40) serve to provide early indication of reactor coolant (NC) leaks in containment to ensure compliance with Technical Specifications and Selected Licensee Commitments. These monitors alarm on small NC leaks in and below the Unusual Event (IC 4.2.U.4) range. Also, these monitors automatically isolate on a safety injection. For these reasons, it is not appropriate to use these monitors as an indication of a loss of the reactor coolant system barrier. The reactor building monitors (EMF-51A and 51B) used for the Fuel Clad EAL 4.1.F.3 are not able to indicate clearly the lower levels of activity in containment resulting from a leak of reactor coolant with normal activity levels. Thus, this EAL will be omitted and other indication will be used to determine a potential loss or loss of the Reactor Coolant System Barrier.

4.1.N.5 Emergency Coordinator/EOF Director Judgement

- This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the NCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgement that the barrier may be considered lost or potentially lost.

FUEL CLAD BARRIER EALs:

The Fuel Clad Barrier is the zircalloy tubes that contain the fuel pellets.

4.1.F.1 Critical Safety Function Status

- Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur. Heat Sink - RED indicates the ultimate heat sink function is under extreme challenge. Either of these conditions indicate a potential loss of the Fuel Clad Barrier.

- Core Cooling - RED indicates significant reactor coolant superheating and core uncovery. Clad damage under these conditions is likely; therefore, this is indication of loss of the Fuel Clad Barrier.

4.1.F.2 Primary Coolant Activity Level

- There is no equivalent "Potential Loss" EAL for this item.

- The value of 300 μCi/cc I-131 equivalent coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. This amount of clad damage indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

4.1.F.3 Containment Radiation Monitoring

- There is no "Potential Loss" EAL associated with this item.

  NOTE: If EMF-51A and EMF-51B are unavailable, readings can be calculated from procedure HP/0/B/1009/02, "Alternative Method for determining Dose Rates within the Reactor Building."

- These values indicate the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage (approximately 5% clad failure depending on core inventory and NCS volume). This EAL indicates a loss of both the fuel clad barrier and a loss of NCS barrier.

4.1.F.4 Emergency Coordinator/EOF Director Judgement

- This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgement that the barrier may be considered lost or potentially lost.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, BASIS INFORMATION FOR TABLE 4

ENCLOSURE 4.2
SYSTEM MALFUNCTIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
4.2.U.1 Inability to Reach Required Shutdown Within Technical Specification Limits.	4.2.A.1 Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable.	4.2.S.1 Inability to Monitor a Significant Transient in Progress.	N/A
4.2.U.2 Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes.			
4.2.U.3 Fuel Clad Degradation.			
4.2.U.4 Reactor Coolant System (NCS) Leakage.			
4.2.U.5 Unplanned Loss of All Onsite or Offsite Communications.			

ENCLOSURE 4.2
SYSTEM MALFUNCTIONS

UNUSUAL EVENT

4.2.U.1 Inability to Reach Required Shutdown Within Technical Specification Limits.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.2.U.1-1 Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.

BASIS:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate Notification of an Unusual Event is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. **Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.** Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other System Malfunction, Hazards, or Fission Product Barrier Degradation ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU2

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

4.2.U.2 Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.2.U.2-1 The following conditions exist:

a. Unplanned loss of most (>50%) annunciators associated with safety systems for greater than 15 minutes.

AND

b. In the opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

BASIS:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment. "Unplanned" loss of annunciators or indicator excludes scheduled maintenance and testing activities. Quantification of "most" is arbitrary; however, this judgement is supported by the specific opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director that additional operating personnel will be required to provide increased monitoring of system operation to safely operate the unit. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Unusual Event will be escalated to an Alert if a transient is in progress during the loss of annunciation or indication.

Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no IC is indicated during these modes of operation.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU3

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

4.2.U.3 Fuel Clad Degradation.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)
Mode 5 (Cold Shutdown)

EMERGENCY ACTION LEVEL:

4.2.U.3-1 Dose Equivalent I-131 greater than the Technical Specification allowable limit.

BASIS:

This IC is included as an Unusual Event because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. The EAL addresses coolant samples exceeding coolant technical specifications for iodine spike. Escalation of this IC to the Alert level is via the Fission Product Barrier Degradation Monitoring ICs. This EAL applies in Modes 1, 2, 3, 4, and 5

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU4

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

4.2.U.4 Reactor Coolant System (NCS) Leakage.

OPERATING MODE APPLICABILITY:

Mode 1 (Power Operations)
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVELS:

4.2.U.4-1 Unidentified leakage $\geq$ 10 gpm.

4.2.U.4-2 Pressure boundary leakage $\geq$ 10 gpm.

4.2.U.4-3 Identified leakage $\geq$ 25 gpm.

BASIS:

This IC is included as an Unusual Event because it may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. NCS leakage is leakage into the containment area or outside the containment area from the Reactor Coolant Pressure Boundary (RCPB). The RCPB is defined by 10CFR50.2 (Definitions) and from this definition the RCPB applicability at McGuire is:

RCPB means all those pressure-containing components of pressurized water-cooled reactors, such as pressure vessels, piping, pumps, and valves, which are:

1. Part of the Reactor Coolant System, or
2. Connected to the Reactor Coolant System, up to and including any and all of the following:
   a. The outermost containment isolation valve in system piping which penetrates containment,
   b. The second of two valves normally closed during normal reactor operation in system piping which does not penetrate containment (MNS has not currently identified any examples),
   c. The pressurizer safety valves and PORVs.

Interconnected system leakage (ie: letdown, RHR) that can be easily detected and readily isolated is not included in this IC. This IC applies to any leak source that cannot be readily detected or isolated (ie: intersystem LOCA, letdown that cannot be isolated). NCS leakage, identified and unidentified, are used in this IC as their Tech Spec definitions. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances). The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation ICs or IC, "Inability to Maintain Plant in Cold Shutdown."

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU5

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

4.2.U.5 Unplanned Loss of All Onsite or Offsite Communications.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.2.U.5-1 Loss of all onsite communications capability (internal phone system, PA system, onsite radio system) affecting the ability to perform routine operations.

4.2.U.5-2 Loss of all offsite communications capability (DEMNET, NRC ETS lines, offsite radio system, commercial phone system) affecting the ability to communicate with offsite authorities.

BASIS:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

This EAL is intended to be used only when extraordinary means are being utilized to make communications possible (relaying of information from radio transmissions, individuals being sent to offsite locations, etc.).

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU6

SYSTEM MALFUNCTIONS

ALERT

4.2.A.1 Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.2.A.1-1 The following conditions exist:

a. Unplanned loss of most (>50%) annunciators associated with safety systems for greater than 15 minutes.

AND

b. In the opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

AND

c. Either of the following:

- A significant plant transient is in progress.
- Loss of the Operator Aid Computer (OAC).

BASIS:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a transient. Quantification of "Most" is arbitrary; however, this judgement is supported by the specific opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director that additional operating personnel will be required to provide increased monitoring of system operation to safely operate the unit. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

"Significant Transient" includes response to automatic or manually initiated functions such as reactor trips, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% or greater.

Significant indication is available from the OAC. Loss of the OAC in conjunction with the loss of other indications would further impair the ability to monitor plant parameters.

Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no IC is indicated during these modes of operation.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SA4

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

4.2.S.1 Inability to Monitor a Significant Transient in Progress.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.2.S.1-1 The following conditions exist:

a. Loss of most (>50%) annunciators associated with safety systems.

AND

b. A significant plant transient is in progress.

AND

c. Loss of the OAC.

AND

d. Inability to provide manual monitoring of any of the following Critical Safety Functions:
   - subcriticality
   - core cooling
   - heat sink
   - containment.

BASIS:

This IC and its associated EAL are intended to recognize the inability of the control room staff to monitor the plant response to a transient. A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public.

"Significant Transient" includes response to automatic or manually initiated functions such as trips, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% or greater.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS6

GENERAL EMERGENCY

Not Applicable

ENCLOSURE 4.3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
4.3.U.1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer.	4.3.A.1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the SLC Limits for 15 Minutes or Longer.	4.3.S.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 100 mRem TEDE or 500 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.	4.3.G.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.
4.3.U.2 Unexpected Increase in Plant Radiation or Airborne Concentration.	4.3.A.2 Major Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.		
	4.3.A.3 Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.		

ENCLOSURE 4.3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

4.3.U.1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

NOTE: If monitor reading is sustained for the time period indicated in the EALs **AND** the required assessments (procedure calculations) cannot be completed within this period, declaration must be made based on the valid radiation monitor reading.

4.3.U.1-1 A valid indication on radiation monitor EMF-49L, EMF-44L, or EMF-31 (when aligned to RC) of $\geq$ 5.45E+06 cpm for $\geq$ 60 minutes or will likely continue for $\geq$60 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure AD-EP-ALL-0202.

4.3.U.1-2 A valid indication on radiation monitor EMF-36L of $\geq$ 2.05E+04 cpm for $\geq$ 60 minutes or will likely continue for $\geq$60 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/010 or AD-EP-ALL-0202.

4.3.U.1-3 A valid indication on radiation monitor EMF-31 (when aligned to WC or WWCB) of $\geq$ 9.174E+03 cpm for $\geq$ 60 minutes or will likely continue for $\geq$60 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/010 or AD-EP-ALL-0202.

4.3.U.1-4 Gaseous effluent being released exceeds two times SLC 16.11-6 for $\geq$ 60 minutes as determined by Radiation Protection (RP) procedure.

4.3.U.1-5 Liquid effluent being released exceeds two times SLC 16.11-1 for $\geq$ 60 minutes as determined by Radiation Protection (RP) procedure.

BASIS:

The term "Unplanned", as used in this context, includes any release for which a liquid waste release (LWR) or gaseous waste release (GWR) package was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable package.

Valid means that a radiation monitor reading has been confirmed to be correct.

Unplanned releases in excess of two times the site Selected Licensee Commitments (SLC) that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. It is not intended that the release be averaged over 60 minutes. The event should be declared as soon as it is determined that the release duration has or will likely exceed 60 minutes.

The gaseous release rate SLC and Technical Specification (TS) are based on limiting gaseous release rates to the SITE BOUNDARY to 500 mr/year total body.

The liquid release rate SLC and TS are based on limiting liquid release rates to the UNRESTRICTED AREA to 10 times the Effluent Concentration (EC) valves given in 10CFR20.1001-20.2401, Appendix B, Table 2, Column 2.

Monitor indications are based on the methodology of the site Offsite Dose Calculation Manual (ODCM). Annual average meteorology has been used. Radiation Protection will use HP/0/B/1009/010, "Release of Radioactive Effluents Exceeding Selected Licensee Commitments"or AD-EP-ALL-0202"Emergency Response Offsite Dose Assessments" to quantify a release.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AU1

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

4.3.U.2 Unexpected Increase in Plant Radiation or Airborne Concentration.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.3.U.2-1 Indication of uncontrolled water level decrease of greater than 6 inches in the reactor refueling cavity with all irradiated fuel assemblies remaining covered by water.

4.3.U.2-2 Uncontrolled water level decrease of greater than 6 inches in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.

4.3.U.2-3 Unplanned valid area EMF reading exceeds the levels shown in Enclosure 4.10 of RP/0/A/5700/000.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.

All of the above events tend to have long lead times relative to potential for radiological release outside the site boundary; thus, impact to public health and safety is very low.

In light of reactor cavity seal failure incidents, explicit coverage of these types of events via EALs 1 and 2 is appropriate given their potential for increased doses to plant staff. A threshold value of 6 inches is used to allow time for mitigating actions to successfully terminate the inventory loss. Credit should not be taken for inventory additions to maintain level above the 6 inch threshold. Classification as an Unusual Event is warranted as a precursor to a more serious event.

EAL 3 addresses unplanned increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. The EMF readings for an Unusual Event are 1000 times the normal value. Enclosure 4.10 of RP/0/A/5700/000 will provide the actual readings for these monitors. This EAL escalates to an Alert if the increases impair safe operation.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AU2

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

4.3.A.1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the SLC limits for 15 Minutes or Longer.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

NOTE: If monitor reading is sustained for the time period indicated in the EALs **AND** the required assessments (procedure calculations) cannot be completed within this period, declaration must be made based on the valid radiation monitor reading.

4.3.A.1-1 A valid indication on radiation monitor EMF-49H of ≥ 1.56E+03 cpm for ≥ 15 minutes or will likely continue for ≥15 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/010 or AD-EP-ALL-0202.

4.3.A.1-2 A valid indication on radiation monitor EMF-36L of ≥ 2.05E+06 cpm for ≥ 15 minutes or will likely continue for ≥15 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/010 or AD-EP-ALL-0202.

4.3.A.1-3 Gaseous effluent being released exceeds 200 times the level of SLC 16.11-6 for ≥ 15 minutes as determined by Radiation Protection (RP) procedure.

4.3.A.1-4 Liquid effluent being released exceeds 200 times the level of SLC 16.11-1 for ≥ 15 minutes as determined by Radiation Protection (RP) procedure.

BASIS:

The term "Unplanned", as used in this context, includes any release for which a liquid waste release (LWR) or gaseous waste release (GWR) package was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set points, etc.) on the applicable package.

Valid means that a radiation monitor reading has been confirmed to be correct.

This event escalates from the Unusual Event by escalating the magnitude of the release by a factor of 100.

It is not intended that the release be averaged over 15 minutes. The event should be declared as soon as it is determined that the release duration has or will likely exceed 15 minutes.

The gaseous release rate SLC and Technical Specification (TS) are based on limiting gaseous release rates to the SITE BOUNDARY to 500 mr/year total body.

The liquid release rate SLC and TS are based on limiting liquid release rates to the UNRESTRICTED AREA to 10 times the Effluent Concentration (EC) valves given in 10CFR20.1001-20.2401, Appendix B, Table 2, Column 2.

Monitor indications are based on the methodology of the site Offsite Dose Calculation Manual (ODCM). Annual average meteorology has been used. Radiation Protection will use HP/0/B/1009/010, "Release of Radioactive Effluents Exceeding Selected Licensee Commitments," or AD-EP-ALL-0202 "Emergency Response Offsite Dose Assessment" to quantify a release.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AA1

ALERT

4.3.A.2 Major Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

Does not apply to spent fuel in dry cask storage. Refer to basis for additional information.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.3.A.2-1 An unplanned valid trip II alarm on any of the following radiation monitors:

a. Spent Fuel Building Refueling Bridge
   1EMF-17
   2EMF-4.

b. Spent Fuel Pool Ventilation
   1EMF-42
   2EMF-42.

c. Reactor Building Refueling Bridge
   1EMF-16 (Applies to Mode 6 and No Mode Only)
   2EMF-3 (Applies to Mode 6 and No Mode Only).

d. Containment Noble Gas Monitors
   1EMF-39 (Applies to Mode 6 and No Mode Only)
   2EMF-39 (Applies to Mode 6 and No Mode Only).

4.3.A.2-2 Plant personnel report that water level drop in reactor refueling cavity, spent fuel pool, or fuel transfer canal has or will exceed makeup capacity such that any irradiated fuel will become uncovered.

4.3.A.2-3 NC system wide range level < 358 inches after initiation of NC system make-up.

AND

Any irradiated fuel assembly not capable of being lowered into spent fuel pool or reactor vessel.

4.3.A.2-4 Spent Fuel Pool or Fuel Transfer Canal level decrease of >2 feet after initiation of make-up.

AND

Any irradiated fuel assembly not capable of being fully lowered into the spent fuel pool racks or transfer canal fuel transfer system basket.

BASIS:

This IC applies to spent fuel requiring water coverage and does not apply to spent fuel in dry cask storage. There is time available to take corrective actions, and there is little potential for substantial fuel damage. Thus, an Alert Classification for this event is appropriate. Escalation, if appropriate, would occur via Abnormal Rad Level/Radiological Effluent or Emergency Coordinator/EOF Director Judgement.

The intent of the "does not apply to spent fuel in dry cask storage" statement is to ensure that spent fuel in dry cask storage is not considered for application under Initiating Condition 4.3.A.2. Spent fuel in dry cask storage can be defined as spent fuel assemblies stored in an Independent Spent Fuel Storage Installation (ISFSI) cask which has been totally evacuated of liquid coolant and completely sealed to preclude leakage to the environment.

It is NOT the intent of the "does not apply to spent fuel in dry cask storage" statement to eliminate any or all consideration of Initiating Condition 4.3.A.2 where spent fuel or other equipment is being manipulated to support loading, evacuating, sealing, or preparing a dry cask for transportation to the ISFSI pads. Several examples of this include:

1) Spent fuel is physically damaged during handling operations to support loading a cask with spent fuel, resulting in a valid trip II alarm on a listed radiation monitor. EAL 4.3.A.2-1 would apply in this case.

2) A dry cask which has been loaded, evacuated, and sealed is tipped over or dropped greater than 12 inches while still in the Spent Fuel Building, resulting in a valid trip II alarm on a listed radiation monitor. In this case, EAL 4.3.A.2-1 would not apply, but EAL 4.7.U.1-6 Independent Spent Fuel Cask tipped over or dropped greater than 12 inches would apply because the cask has been loaded, evacuated, and sealed as a unit.

3) During dry cask operations, actual spent fuel damage occurs prior to evacuating and sealing the cask due to other unassociated events, resulting in a valid trip II alarm on a listed radiation monitor. EAL 4.3.A.2-1 would apply in this case.

The key to evaluating such an event is <u>when</u> the spent fuel damage occurs. After a dry cask has been evacuated and sealed, this IC does not apply, but IC 4.7.U.1 could apply. Damage to spent fuel that may occur in the dry cask storage process prior to completion of evacuation and sealing of the dry cask should be considered under this IC.

EAL 2: Due to concerns for ALARA and personnel safety, personnel should not remain in the area to observe that irradiated fuel is uncovered. Personnel should exit the area as quickly as possible and report the occurrence to the Control Room.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AA2

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

4.3.A.3 Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.3.A.3-1 Valid reading on EMF-12 greater than 15 mR/hr in the Control Room.

4.3.A.3-2 Valid indication of radiation levels greater than 15 mR/hr in the Central Alarm Station (CAS) or Secondary Alarm Station (SAS).

4.3.A.3-3 Valid area EMF reading exceeds the limits shown in Enclosure 4.10 of RP/0/A/5700/000.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.

This initiating condition (IC) addresses increased radiation levels that impede necessary access to operating stations, or other areas containing equipment that must be operated manually, in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. This situation is indicative of a significant radiological problem that warrants additional resources to assess and mitigate.

This IC is not intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

The Control Room, CAS, and SAS are areas that require continuous occupancy. The value of 15 mR/hr is derived from the GDC 19 (general design criteria) value of 5 Rem in 30 days with adjustment for expected occupancy times.

McGuire has chosen to use a generic emergency action level of greater than or equal to 5000 mRad/hr for areas in the plant that are normally accessible as low dose rate areas that have equipment installed, operated, and used for safe operation or safe shutdown of the unit. Radiation levels at or above this range may make it difficult to complete tasks necessary for safe operation of the plant or to establish or maintain cold shutdown without exceeding normal occupational dose limits of 5 Rem per year TEDE. Enclosure 4.10 of RP/0/A/5700/000 provides the monitor number and the location of the area monitor.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AA3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

SITE AREA EMERGENCY

4.3.S.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 100 mRem TEDE or 500 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

NOTE 1: These EMF readings are calculated based on average annual meteorology, site boundary dose rate, and design unit vent flow rate. Calculations by the dose assessment team use actual meteorology, release duration, and unit vent flow rate. Therefore, these EMF readings should not be used if dose assessment team calculations are available.

NOTE 2: If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

4.3.S.1-1 A valid indication on radiation monitor EMF-36H of ≥ 3.4E +03 cpm sustained for ≥15 minutes.

4.3.S.1-2 Dose assessment team calculations indicate dose consequences greater than 100 mRem TEDE or 500 mRem CDE Adult Thyroid at the site boundary.

4.3.S.1-3 Analysis of field survey results or field survey samples indicates dose consequences greater than 100 mRem TEDE or 500 mRem CDE Adult Thyroid at the site boundary.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.

The 100 mRem integrated dose in this initiating condition is based on 10 CFR 20 annual average population exposure. This value also provides a desirable gradient (one order of magnitude) between the Alert, Site Area Emergency, and General Emergency classes. These values are 10% of the EPA Protective Action Guide (PAG) values given in EPA-400-R-92-001.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AS1

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

GENERAL EMERGENCY

4.3.G.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

NOTE 1: These EMF readings are calculated based on average annual meteorology, site boundary dose rate, and design unit vent flow rate. Calculations by the dose assessment team use actual meteorology, release duration, and unit vent flow rate. Therefore, these EMF readings should not be used if dose assessment team calculations are available.

NOTE 2: If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

4.3.G.1-1 A valid indication on radiation monitor EMF-36H of $\geq$ 3.4 E +04 cpm sustained for $\geq$15 minutes.

4.3.G.1-2 Dose assessment team calculations indicate dose consequences greater than 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid at the site boundary.

4.3.G.1-3 Analysis of field survey results or field survey samples indicates dose consequences greater than 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid at the site boundary.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.

The 1000 mRem TEDE and 5000 mRem CDE thyroid integrated doses are based on the EPA PAG values given in EPA-400-R-92-001, which indicates that public protective actions are indicated if doses exceed these values. This is consistent with the emergency class description of a general emergency.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, AG1

ENCLOSURE 4.4
LOSS OF SHUTDOWN FUNCTIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
N/A	4.4.A.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip **WAS** Successful.	4.4.S.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip **WAS NOT** Successful.	4.4.G.1 Failure of the Reactor Protection System to Complete an Automatic Trip and Manual Trip **WAS NOT** Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.
	4.4.A.2 Inability to Maintain Plant in Cold Shutdown.	4.4.S.2 Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown.	
		4.4.S.3 Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel.	

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

UNUSUAL EVENT

Not Applicable

LOSS OF SHUTDOWN FUNCTIONS

ALERT

4.4.A.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip WAS Successful.

OPERATING MODE APPLICABILITY: Mode 1 (Power Operation)
Mode 2 (Startup)
Mode 3 (Hot Standby)

EMERGENCY ACTION LEVEL:

4.4.A.1-1 The following conditions exist:

a. Valid reactor trip signal received or required and automatic reactor trip was not successful.

AND

b. Manual reactor trip from the control room is successful and reactor power is less than 5% and decreasing.

BASIS:

This condition indicates failure of the automatic protection system to trip the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded. An Alert is indicated because conditions exist that lead to potential loss of fuel clad or NCS. Reactor protection system setpoint being exceeded (rather than limiting safety system setpoint being exceeded) is specified here because failure of the automatic protection system is the issue. A manual trip is any set of actions by the reactor operator(s) at the reactor control console which causes control rods to be RAPIDLY inserted into the core and brings the reactor subcritical. Operator action to drive rods does NOT constitute a reactor trip, i.e. does not meet the rapid insertion criterion.

Failure of manual trip would escalate the event to a Site Area Emergency.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SA2

LOSS OF SHUTDOWN FUNCTIONS

ALERT

4.4.A.2 Inability to Maintain Plant in Cold Shutdown.

OPERATING MODE APPLICABILITY: Mode 5 (Cold Shutdown)
Mode 6 (Refueling)

EMERGENCY ACTION LEVEL:

4.4.A.2-1 Total loss of Residual Heat Removal (ND) and/or Nuclear Service Water (RN) and/or Component Cooling (KC)

AND

One of the following:

- Inability to maintain reactor coolant temperature below 200 ^{o}F
- Uncontrolled reactor coolant temperature rise to >180°F.

BASIS:

This EAL addresses loss of functions required for core cooling during cold shutdown and refueling conditions. This IC and associated EALs are based on concerns raised by Generic Letter 88-17, "Loss of Decay Heat Removal." A number of phenomena such as pressurization, vortexing, steam generator U-tube draining, NCS level differences when operating at a mid-loop condition, decay heat removal system design, and level instrumentation problems can lead to conditions where decay heat removal is lost and core uncovery can occur. NRC analyses show that sequences that can cause core uncovery in 15 to 20 minutes and severe core damage within an hour after decay heat removal is lost.

Escalation to the Site Area Emergency is by, "Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel," or by Abnormal Rad Levels/Radiological Effluent ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SA3

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

4.4.S.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip WAS NOT Successful.

OPERATING MODE APPLICABILITY: Mode 1 (Power Operation)

EMERGENCY ACTION LEVEL:

4.4.S.1-1 The following conditions exist:

a. Valid reactor trip signal received or required and automatic reactor trip was not successful.

AND

b. Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

BASIS:

Automatic and manual trip are not considered successful if action away from the reactor control console is required to trip the reactor. This EAL is equivalent to the Subcriticality CSF-RED.

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that lead to imminent loss or potential loss of both fuel clad and NCS. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response. Escalation of this event to a General Emergency would be via Fission Product Barrier Degradation or Emergency Coordinator/EOF Director Judgement ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS2

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

4.4.S.2 Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVELS:

4.4.S.2-1 Subcriticality CSF-RED.

4.4.S.2-2 Heat Sink CSF-RED.

BASIS:

This EAL addresses complete loss of functions, including ultimate heat sink and reactivity control, required for hot shutdown with the reactor at pressure and temperature. Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Abnormal Rad Levels/Radiological Effluent, Emergency Coordinator/EOF Director Judgement, or Fission Product Barrier Degradation ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS4

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

4.4.S.3 Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel.

OPERATING MODE APPLICABILITY: Mode 5 (Cold Shutdown)
Mode 6 (Refueling)

EMERGENCY ACTION LEVELS:

4.4.S.3-1 a. Failure of heat sink causes loss of cold shutdown conditions.

AND

b. Lower range Reactor Vessel Level Indication System (RVLIS) decreasing after initiation of NC system makeup.

4.4.S.3-2 a. Failure of heat sink causes loss of cold shutdown conditions.

AND

b. Reactor Coolant (NC) system narrow range level less than 6 inches and decreasing after initiation of NC system makeup.

4.4.S.3-3 a. Failure of heat sink causes loss of cold shutdown conditions.

AND

b. Either train ultrasonic level indication less than 6 inches and decreasing after initiation of NC system makeup.

BASIS:

Under the conditions specified by this IC, severe core damage may be imminent due to prolonged boiling following loss of decay heat removal.

Thus, declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via radiological effluent IC.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS5

LOSS OF SHUTDOWN FUNCTIONS

GENERAL EMERGENCY

4.4.G.1 Failure of the Reactor Protection System to Complete an Automatic Trip and Manual Trip WAS NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

OPERATING MODE APPLICABILITY: Mode 1 (Power Operation)

EMERGENCY ACTION LEVEL:

4.4.G.1-1 The following conditions exist:

a. Valid reactor trip signal received or required and automatic reactor trip was not successful.

AND

b. Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

AND

c. Either of the following conditions exist:

- Core Cooling CSF-RED
- Heat Sink CSF-RED.

BASIS

Automatic and manual trip are not considered successful if action away from the reactor control console is required to trip the reactor.

Under the conditions of this IC and its associated EALs, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed.

The extreme challenge to the ability to cool the core is intended to mean that the core exit temperatures are at or approaching $1200^{o}F$ or that the reactor vessel water level is below the top of active fuel. This equates to a Core Cooling-RED condition.

Another consideration is the inability to initially remove heat during the early stages of this sequence. If emergency feedwater flow is insufficient to remove the amount of heat required by

design from at least one steam generator, an extreme challenge should be considered to exist. This equates to a Heat Sink-RED condition.

In the event either of these challenges occurs during or following a time that the reactor has not been brought below the power associated with the safety system design, core damage may be imminent. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum offsite intervention time.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SG2

ENCLOSURE 4.5
LOSS OF POWER

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
4.5.U.1 Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes.	4.5.A.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown Or Refueling Mode.	4.5.S.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses.	4.5.G.1 Prolonged Loss of All (Offsite and Onsite) AC Power.
4.5.U.2 Unplanned Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater than 15 Minutes.	4.5.A.2 AC Power to Essential Busses Reduced to a Single Power Source for Greater Than 15 Minutes Such That an Additional Single Failure Could Result in Station Blackout.	4.5.S.2 Loss of All Vital DC Power.	

ENCLOSURE 4.5
LOSS OF POWER

UNUSUAL EVENT

4.5.U.1 Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.5.U.1-1 The following conditions exist:

a. Loss of offsite power to essential buses ETA and ETB for greater than 15 minutes.

AND

b. Both emergency diesel generators are supplying power to their respective essential busses.

OPERATING MODE APPLICABILITY: **Mode 5 (Cold Shutdown)**
Mode 6 (Refueling)
No Mode (Defueled)

EMERGENCY ACTION LEVEL:

4.5.U.1-2 The following conditions exist:

a. Loss of offsite power to essential buses ETA and ETB for greater than 15 minutes.

AND

b. One emergency diesel generator is supplying power to its respective essential bus.

BASIS:

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (Station Blackout). When in cold shutdown, refueling, or defueled mode the event can be classified as an Unusual Event, because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the essential busses, relative to that specified for the Alert EAL The event will escalate to an Alert in these modes if both essential busses are lost. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU1

LOSS OF POWER

UNUSUAL EVENT

4.5.U.2 Unplanned Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater than 15 Minutes.

OPERATING MODE APPLICABILITY: Mode 5 (Cold Shutdown)
Mode 6 (Refueling)

EMERGENCY ACTION LEVEL:

4.5.U.2-1 The following conditions exist:

a. Unplanned loss of both unit related EVDA and EVDD busses as indicated by bus voltage less than 110 VDC.

AND

b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

BASIS:

The purpose of this IC and its associated EALs is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations. This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

"Unplanned" is included in this IC and EAL to preclude the declaration of an emergency as a result of planned maintenance activities.

If this loss results in the inability to maintain cold shutdown, the escalation to an Alert is via "Inability to Maintain Plant in Cold Shutdown."

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SU7

LOSS OF POWER

ALERT

4.5.A.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown Or Refueling Mode.

OPERATING MODE APPLICABILITY: Mode 5 (Cold Shutdown)
Mode 6 (Refueling)
No Mode (Defueled)

EMERGENCY ACTION LEVEL:

4.5.A.1-1 Loss of all offsite and onsite AC power as indicated by:

a. Loss of power on essential buses ETA and ETB.

AND

b. Failure to restore power to at least one essential bus within 15 minutes.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including Residual Heat Removal (RHR), Emergency Core Cooling Systems (ECCS), Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink. When in cold shutdown, refueling, or defueled mode the event can be classified as an Alert, because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the essential busses, relative to that specified for the Site Area Emergency EAL. Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels/Radiological Effluent, or Emergency Coordinator/EOF Director Judgement ICs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SA1

LOSS OF POWER

ALERT

4.5.A.2 AC Power to Essential Busses Reduced to a Single Power Source for Greater Than 15 Minutes Such That an Additional Single Failure Could Result in Station Blackout.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.5.A.2-1 The following condition exists:

AC power capability has been degraded to one essential bus powered from a single power source for > 15 min. due to the loss of all but one of:

SATA
SATB
ATC
ATD
D/G A
D/G B.

BASIS:

This IC and the associated EAL is intended to provide an escalation from IC, "Loss of All Offsite Power To Essential Busses for Greater Than 15 Minutes." The condition indicated by this IC is the degradation of the offsite and onsite power systems such that an additional single failure could result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of one emergency generator to supply power to its essential busses. Another related condition could be the loss of all offsite power and loss of onsite emergency diesels with only one train of essential busses being back fed from the unit main generator, or the loss of onsite emergency diesels with only one train of essential busses being back fed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with IC, "Loss of All Offsite and Loss of All Onsite AC Power to Essential Busses."

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SA5

LOSS OF POWER

SITE AREA EMERGENCY

4.5.S.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses.

OPERATING MODE APPLICABILITY: Mode 1 (Power Operation)
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.5.S.1-1 Loss of all offsite and onsite AC power as indicated by:

a. Loss of power on essential buses ETA and ETB.

AND

b. Failure to restore power to at least one essential bus within 15 minutes.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will cause core uncovering and loss of containment integrity; thus, this event can escalate to a General Emergency.

Escalation to General Emergency is via Fission Product Barrier Degradation or IC, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power."

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS1

LOSS OF POWER

SITE AREA EMERGENCY

4.5.S.2 Loss of All Vital DC Power.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.5.S.2-1 The following conditions exist:

a. Loss of both unit related EVDA and EVDD busses as indicated by bus voltage less than 110 VDC.

AND

b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

BASIS:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation, or Emergency Coordinator/EOF Director Judgement ICs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SS3

LOSS OF POWER

GENERAL EMERGENCY

4.5.G.1 Prolonged Loss of All (Offsite and Onsite) AC Power.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)

EMERGENCY ACTION LEVEL:

4.5.G.1-1 Prolonged loss of all offsite and onsite AC power as indicated by:

a. Loss of power on essential buses ETA and ETB for greater than 15 minutes.

AND

b. Standby Shutdown Facility (SSF) fails to supply NC pump seal injection **OR** CA supply to steam generators.

AND

c. At least one of the following conditions exist:

- Restoration of at least one essential bus within 4 hours is **NOT** likely.
- Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all those functions necessary to maintain hot shutdown will lead to loss of fuel clad, NCS, and containment.

The SSF is capable of providing the necessary functions (reactor coolant pump seal injection and auxiliary feedwater supply to the steam generators) to maintain a hot shutdown condition for up to 72 hours. No fission product barrier degradation would be expected if the SSF is functioning as intended.

Analysis in support of the station blackout coping study indicates that the plant can cope with a station blackout for 4 hours without core damage.

The likelihood of restoring at least one essential bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Coordinator/EOF Director a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that Loss or Potential Loss of Fission Product Barriers is IMMINENT?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Emergency Coordinator/EOF Director judgement as it relates to IMMINENT Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, SG1

ENCLOSURE 4.6
FIRE/EXPLOSION AND SECURITY EVENTS

UNUSUAL EVENT

4.6.U.1 Fire Within Protected Area Boundary **NOT** Extinguished Within 15 Minutes of Detection **OR** Explosion Within the Protected Area Boundary.

4.6.U.2 Confirmed **SECURITY CONDITION** or threat Which Indicates a Potential Degradation in the Level of Safety of the Plant.

4.6.U.2 Confirmed **SECURITY CONDITION** or threat Which Indicates a Potential Degradation in the Level of Safety of the Plant.

ALERT

4.6.A.1 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

4.6.A.2 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

4.6.A.2 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

4.6.A.3 HOSTILE ACTION within the **OWNER CONTROLLED AREA** or Airborne Attack Threat

SITE AREA EMERGENCY

4.6.S.1 **HOSTILE ACTION** within the **PROTECTED AREA**

GENERAL EMERGENCY

4.6.G.1 **HOSTILE ACTION** Resulting in Loss of Physical Control o fthe Facility.

ENCLOSURE 4.6

FIRE/EXPLOSION AND SECURITY EVENTS

UNUSUAL EVENT

4.6.U.1 Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Detection OR Explosion Within the Protected Area Boundary.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.6.U.1-1 Fire in any of the following areas **not** extinguished within 15 minutes of control room notification or verification of a control room fire alarm.

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility (SSF)
- Central Alarm Station (CAS)
- Secondary Alarm Station (SAS)
- Doghouses
- Refueling Water Storage Tank (FWST)
- Turbine Building
- Service Building
- Interim Radwaste Building
- Equipment Staging Building
- ISFSI.

4.6.U.1-2 Report by plant personnel of an unanticipated explosion within protected area boundary resulting in visible damage to permanent structures or equipment or to a loaded cask in the ISFSI.

BASIS:

EAL 1: The purpose of this EAL is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. Fire is combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flames is preferred but is NOT required if large quantities of smoke and heat are observed. This excludes such items as fires within administration buildings outside the protected area. Waste-basket fires, and other small fires of no safety consequence should easily be extinguished within 15 minutes of detection. This IC applies to buildings and areas contiguous to plant vital areas or other significant buildings or

areas. Verification of the alarm in this context means those actions taken in the control room to determine that the control room alarm is not spurious.

EAL 2: Only those explosions of sufficient force to damage permanent structures or equipment within the protected area or to a loaded cask in the ISFSI area should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the explosion with reports of evidence of damage (e.g., deformation, scorching) is sufficient for declaration. The Emergency Coordinator/EOF Director also needs to consider any security aspects of the explosion, if applicable.

Escalation to a higher emergency class is by, "Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown".

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) These ICs are categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

ISFSI Technical Specifications allow time to complete required actions if cask seal integrity is not maintained; therefore, classification should not be made based on a loss of seal integrity by itself. However, loss of seal integrity coincident with an accident condition affecting a cask would justify classification.

For these EALs the results of the ISFSI Safety Analysis Report (SAR) per NUREG 1536 was used to develop the site-specific list of accident conditions.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HU2, NEI 99-01 (Methodology for Development of Emergency Action Levels) Draft Final Rev 4, McGuire ISFSI Safety Analysis Report.

FIRE/EXPLOSION AND SECURITY EVENTS

UNUSUAL EVENT

4.6.U.2 Confirmed SECURITY CONDITION or Threat Which Indicates a Potential Degradation in the Level of Safety of the Plant.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.6.U.2-1 A **SECURITY CONDITION** that does **NOT** involve a **HOSTILE ACTION** as reported by the MNS Security shift supervision.

4.6.U.2-2 A credible site-specific security threat notification.

4.6.U.2-3 A validated notification from NRC providing information of an aircraft threat.

BASIS:

Note: Timely and accurate communication between security shift supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as **HOSTILE ACTIONS** are classifiable under 4.6.A.3, 4.6.S.1 and 4.6.G.1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

EAL #1

Reference is made to site specific security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classifcation confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

The threshold is based on site specific security plans. Site specific Safeguards Contingency Plans are based on guidance provided by NEI 03-12.

EAL #2

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the site specific Safeguards Contingency Plan.

EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and thatOROs and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via 4.6.A.3 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

REFERENCE: NEI 99-01 rev 5, (HU4) Methodology for Developement of Emergency Action Levels. This change is to support NEI 03-12 implementation. {PIP G-09-0360}

FIRE/EXPLOSION AND SECURITY EVENTS

ALERT

4.6.A.1 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

OPERATING MODE APPLICABILITY: **Mode 1 (Power Operation)**
Mode 2 (Startup)
Mode 3 (Hot Standby)
Mode 4 (Hot Shutdown)
Mode 5 (Cold Shutdown)
Mode 6 (Refueling)

EMERGENCY ACTION LEVEL:

4.6.A.1-1 The following conditions exist:
(includes non-security events)

a. Fire or explosion in any of the following areas:
- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- CAS
- SAS
- FWST
- Doghouses (Applies in Mode 1, 2, 3, 4 only).

AND

b. One of the following:

Note: Only one train of a system needs to be affected or damaged in order to satisfy this condition.

- Affected safety system parameter indications show degraded performance

- Plant personnel report visible damage to permanent structures or equipment within the specified area.

BASIS:

With regard to explosions, only those explosions of sufficient force to damage permanent structures or equipment required for safe operation within the identified plant area should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. Fire is combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flames is preferred but is NOT required if large quantities of smoke and heat are observed. The inclusion of a "report of visible damage" should not be interpreted as mandating a lengthy damage assessment prior to classification.

The key to classifying fires/explosions as an Alert is the damage as a result of the incident. The fact that safety-related equipment required for safe shutdown of the unit has been affected or damaged as a result of the fire/explosion is the driving force for declaring the Alert. **It is important to note that this EAL addresses a fire/explosion and not just the degradation of a safety system. The reference to damage of the systems is used to identify the magnitude of the fire/explosion and to discriminate against minor fires/explosions.**

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Emergency Coordinator/EOF Director Judgement ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA2

FIRE/EXPLOSION AND SECURITY EVENTS

ALERT

4.6.A.2 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

OPERATING MODE APPLICABILITY: **No Mode (Defueled)**

EMERGENCY ACTION LEVEL:

4.6.A.2-1 The following conditions exist:
(includes non-security events)

a. Fire or explosion in any of the following areas:
   - Spent Fuel Pool
   - Auxiliary Building.

   AND

b. One of the following:

   Note: Only one train of a system needs to be affected or damaged in order to satisfy this condition.

   - Spent Fuel Pool level and/or temperature show degraded performance.

   - Plant personnel report visible damage to permanent structures or equipment supporting Spent Fuel Pool cooling.

BASIS:

In a Defueled condition, the plant safety systems of interest are those that support Spent Fuel Pool inventory and cooling.

With regard to explosions, only those explosions of sufficient force to damage permanent structures or equipment required for safe operation within the identified plant area should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. Fire is combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flames is preferred but is NOT required if large quantities of smoke and heat are

observed. The inclusion of a "report of visible damage" should not be interpreted as mandating a lengthy damage assessment prior to classification.

The key to classifying fires/explosions as an Alert is the damage as a result of the incident. The fact that safety-related equipment required for safe shutdown of the unit has been affected or damaged as a result of the fire/explosion is the driving force for declaring the Alert. **It is important to note that this EAL addresses a fire/explosion and not just the degradation of a safety system. The reference to damage of the systems is used to identify the magnitude of the fire/explosion and to discriminate against minor fires/explosions.**

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Emergency Coordinator/EOF Director Judgement ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA2

FIRE/EXPLOSION AND SECURITY EVENTS

ALERT

4.6.A.3 HOSTILE ACTION within OWNER CONTROLLED AREA or airborne attack threat.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.6.A.3-1 A **HOSTILE ACTION** is occurring or has occurred within the **OWNER CONTROLLED AREA** as reported by the MNS Security Shift Supervision.

4.6.A.3-2 A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

BASIS:

Note: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL #1

This EAL addresses the potential for a very rapid progression of events due to a **HOSTILE ACTION**. It is not intended to address incidents that accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees with the OCA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any **HOSTILE ACTION** occurring, or that has occurred, in the **OWNER CONTROLLED AREA**. This includes ISFSI's that may be outside the **PROTECTED AREA** but still within the **OWNER CONTROLLED AREA**.

[Although nuclear plant security officers are well trained and prepared to protect against **HOSTILE ACTION**, it is appropriate for OROs to be notified and encouraged to begin activation (if they do not normally) to be better prepared should it be necessary to consider further actions.]

[If not previously notified by the NRC that the airborne **HOSTILE ACTION** was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.]

EAL #2

This EAL addreses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL list to ensure that notifications for the airliner attack threat are made in a timely manner and that OROs and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding a airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

REFERENCE: EI 99-01 rev 5 (HA4) Methodology for Development of Emergency Action Levels. This change is to support NEI 03-12 implementation. {PIP G-09-0360}

FIRE/EXPLOSION AND SECURITY EVENTS

SITE AREA EMERGENCY

4.6.S.1 HOSTILE ACTION within the PROTECTED AREA.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.6.S.1-1 A **HOSTILE ACTION** is occurring or has occurred within the **PROTECTED AREA** as reported by the MNS Security Shift Supervision.

BASIS:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a **HOSTILE FORCE** has progressed from the **OWNER CONTROLLED AREA** to the **PROTECTED AREA**.

This EAL addresses the cotingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and inderterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires ORO readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a **HOSTILE ACTION**. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the **PROTECTED AREA**. Those events are adequately addressed by other EALs.

[Although nuclear plant security officers are well trained and prepared to protect against **HOSTILE ACTION**, it is appropriate for OROs to be notified and encouraged to begin preparations for public protective actions (if they do not normally) to be better prepared should it be necessary to consider further actions.]

[If not previously notified by NRC that the airborne **HOSTILE ACTION** was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.]

Escalation of this emergency classifcation level, if appropriate, would be based on actual plant status after impact or progression of attack.

REFERENCE: EI 99-01 rev 5 (HS4) Methodology for Development of Emergency Action Levels. This change is to support NEI 03-12 implementation. {PIP G-09-0360}

FIRE/EXPLOSION AND SECURITY EVENTS

GENERAL EMERGENCY

4.6.G.1 HOSTILE ACTION resulting in loss of physical control of the facility.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.6.G.1-1 A **HOSTILE ACTION** has occurred such that plant personnel are uable to operate equipment required to maintain safety functions.

4.6.G.1-2 A **HOSTILE ACTION** has caused failure of Spent Fuel Cooling Systems and **IMMINENT** fuel damage is likely for a freshly off-loaded reactor core in pool.

BASIS:

EAL #1

This EAL encompasses conditions under which a **HOSTILE ACTION** has resulted in a loss of physical control of **VITAL AREAS** (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location.

[Typically, these safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink) for a BWR. The equivalent functions for a PWR are reactivity control, RCS inventory, and secondary heat removal.]

[Loss of physical control of the control room or remote shutdown capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.]

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

EAL #2

This EAL addresses failure of spent fuel cooling systems as a result of **HOSTILE ACTION** if **IMMINENT** fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool.

A freshly off-loaded reactor core is: The complete removal and relocation of all fuel assemblies from the reactor core and placed in the spent fuel pool. (Typical of a "No Mode" operation during a refuel outage that allows safety system maintenance to occur and results in maximum decay heat load in the spent fuel pool system).

REFERENCE: NEI 99-01 rev 5 (HG1) Methodology for Development of Emergency Action Levels. This change is to support NEI 03-12 implementation. {PIP G-09-0360}

ENCLOSURE 4.7
NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

4.7.U.1 Natural and Destructive Phenomena Affecting the Protected Area.

4.7.U.2 Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant.

4.7.U.3 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of an Unusual Event.

ALERT

4.7.A.1 Natural and Destructive Phenomena Affecting the Plant Vital Area.

4.7.A.2 Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

4.7.A.3 Control Room Evacuation Has Been Initiated.

4.7.A.4 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of an Alert.

SITE AREA EMERGENCY

4.7.S.1 Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

4.7.S.2 Other Conditions Existing Which in the Judgement of The Emergency Coordinator/EOF Director Warrant Declaration of Site Area Emergency.

GENERAL EMERGENCY

4.7.G.1 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of General Emergency.

ENCLOSURE 4.7
NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

4.7.U.1 Natural and Destructive Phenomena Affecting the Protected Area.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.7.U.1-1 Tremor felt and valid alarm on the Syscom Seismic Monitoring System (OAC M1D2422).

4.7.U.1-2 Report by plant personnel of tornado striking within protected area boundary including the ISFSI.

4.7.U.1-3 Vehicle crash into plant structures or systems within protected area boundary including the ISFSI.

4.7.U.1-4 Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

4.7.U.1-5 ISFSI cask tipped over or dropped greater than 12 inches.

4.7.U.1-6 Uncontrolled flooding in the ISFSI area.

4.7.U.1-7 Tornado generated missile(s) impacting the ISFSI.

BASIS:

The protected area boundary is typically that part within the security isolation zone and is defined in the site security plan.

EAL 1: Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Method of detection can be based on instrumentation, validated by a reliable source, or operator assessment. As defined in the EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is:

> An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators, and (b) valid alarm on seismic instrumentation occurs.

EAL 2: A tornado striking (touching down) within the protected boundary may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert. See ISFSI information covered under EAL 5, 6 & 7.

EAL 3: Addresses such items as a car, truck, plane, helicopter, or train crash that may potentially damage plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant vital area, the event may be escalated to Alert. See ISFSI information covered under EAL 5, 6 & 7.

EAL 4: Addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual fires and flammable gas build up are appropriately classified via other EALs. This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by the missiles generated by the failure or by the radiological releases in conjunction with a steam generator tube rupture. These latter events would be classified by the Radiological ICs or Fission Product Barrier ICs.

EALs 5, 6 & 7: These ISFSI related ICs are categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

ISFSI Technical Specifications allow time to complete required actions if cask seal integrity is not maintained; therefore, classification should not be made based on a loss of seal integrity by itself. However, loss of seal integrity coincident with an accident condition affecting a cask would justify classification.

For these EALs the results of the ISFSI Safety Analysis Report (SAR) per NUREG 1536 was used to develop the site-specific list of accident conditions.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HU1, NEI 99-01 (Methodology for Development of Emergency Action Levels) Draft Final Rev 4, McGuire ISFSI Safety Analysis Report.
NOTE: NUMARC EAL #5 moved to Fire/Security Recognition Category

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

4.7.U.2 Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.7.U.2-1 Report or detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect safe operation of the plant.

4.7.U.2-2 Report by Local, County or State Officials for potential evacuation of site personnel based on offsite event.

BASIS:

This IC is based on releases in concentrations within the site boundary that will affect the health of plant personnel or the safe operation of the plant with the plant being within the evacuation area of an offsite event (i.e., tanker truck accident releasing toxic gases, etc.).

Gases within the owner controlled area that are below life threatening or flammable concentrations do not meet this EAL.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HU3

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

4.7.U.3 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of an Unusual Event.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.U.3-1 Other conditions exist which in the judgement of the Emergency Coordinator/EOF Director indicate a potential degradation of the level of safety of the plant.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the Unusual Event emergency class.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HU5

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

4.7.A.1 Natural and Destructive Phenomena Affecting the Plant Vital Area.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

4.7.A.1-1 Valid "OBE Exceeded" Alarm on 1AD-13, E-7

4.7.A.1-2 Tornado or high winds:

Tornado striking plant structures within the vital area

- Reactor Building
- Auxiliary Building
- Refueling Water Storage Tank (FWST)
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility (SSF)
- Doghouses
- Central Alarm Station (CAS)
- Secondary Alarm Station (SAS)

OR

Sustained winds $\geq$ 74 mph for > 15 minutes. {4}

4.7.A.1-3 Visible structural damage caused by either: vehicle crashes, or turbine failure generated missiles, or other catastrophic events on any of the following plant structures:

- Reactor Building
- Auxiliary Building
- Refueling Water Storage Tank (FWST)
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility (SSF)
- Doghouses
- Central Alarm Station (CAS)
- Secondary Alarm Station (SAS)
- Ultimate Heat Sink (Standby Nuclear Service Water Pond Dam and Dikes).

BASIS:

EAL 1: Based on the FSAR design basis. Seismic events of this magnitude (> OBE) can cause damage to safety functions.

EAL 2: Based on the available instrumentation and the FSAR design basis. Wind loads of this magnitude can cause damage to safety functions.

EAL 3: This EAL is intended to address the threat to safety related structures or equipment from uncontrollable and possibly catastrophic events. This list of areas includes areas containing safety-related equipment, their controls, and their power supplies. This EAL is, therefore, consistent with the definition of an ALERT in that if events have damaged areas containing safety-related equipment the potential exists for substantial degradation of the level of safety of the plant.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA1

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

4.7.A.2 Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

Structures for both EALs:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- Doghouses
- CAS
- SAS.

4.7.A.2-1 Report or detection of toxic gases within a Facility Structure in concentrations that will be life threatening to plant personnel.

4.7.A.2-2 Report or detection of flammable gases within a Facility Structure in concentrations that will affect the safe operation of the plant.

BASIS:

This IC is based on gases that have entered a plant structure affecting the safe operation of the plant. Safe operations are affected when the area can not be accessed by plant personnel to ensure continued operability or availability of safety systems/components. This IC applies to buildings and areas contiguous to plant Vital Areas or other significant buildings or areas. The intent of this IC is not to include buildings (i.e., warehouses) or other areas that are not contiguous or immediately adjacent to plant Vital Areas. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radioactive Effluent, or Emergency Coordinator/EOF Director Judgement ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA3

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

4.7.A.3 Control Room Evacuation Has Been Initiated.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.A.3-1 Control Room evacuation has been initiated per AP/1(2)/A/5500/017 or AP/1(2)/A/5500/024. {2}

BASIS:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or Emergency Operations Facility is necessary. Inability to establish plant control from outside the control room, as evidenced by the inability to maintain NCS or SG inventories, will escalate this event to a Site Area Emergency.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA5

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

4.7.A.4 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of an Alert.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.A.4-1 Other conditions exist which in the Judgement of the Emergency Coordinator/EOF Director indicate that plant safety systems may be degraded and that increased monitoring of plant functions is warranted.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the Alert emergency class.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HA6

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

4.7.S.1 Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.S.1-1 The following conditions exist:

a. Control room evacuation has been initiated per AP/1(2)/A/5500/017 or AP/1(2)/A/5500/024. {2}

AND

b. Control of the plant cannot be established from the Auxiliary Shutdown Panel or the Standby Shutdown Facility within 15 minutes.

BASIS:

The timely transfer of control to alternate control areas has not been accomplished. This failure to transfer control would be evidenced by deteriorating reactor coolant system or steam generator parameters. For purposes of classification, the 15 minutes begins at the time that the determination to staff the alternate location is made. For most conditions, Reactor Coolant Pump seal LOCAs or steam generator dryout would be indications of failure to accomplish the transfer in the necessary time.

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Emergency Coordinator/EOF Director Judgement ICs.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HS2

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

4.7.S.2 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of Site Area Emergency.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.S.2-1 Other conditions exist which in the judgement of the Emergency Coordinator/EOF Director indicate actual or likely major failures of plant functions needed for protection of the public.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the emergency class description for Site Area Emergency.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HS3

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

GENERAL EMERGENCY

4.7.G.1 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of General Emergency.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVEL:

4.7.G.1-1 Other conditions exist which in the judgement of the Emergency Coordinator/EOF Director indicate: (1) actual or imminent substantial core degradation with potential for loss of containment, or (2) potential for uncontrolled radionuclide releases. These releases can reasonably be expected to exceed Environmental Protection Agency Protective Action Guideline levels outside the site boundary.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the General Emergency class.

REFERENCE: NUMARC/NESP-007, REV. 2, 01/92, HG2

Commitment Reference for Emergency Action Levels

{1} PIP-M-00-2138, CA #18
{2} PIP-M-01-2860, CA #2
{3} PIP-M-05-3403, CA #3, multiple changes in enclosure 4.6
{4} PIP-M-03-4281, CA #3
{5} PIP-M-06-5137, CA #2

§50.54(q) Screening Evaluation Form **Activity Description and References: MNS Emergency Plan Section D (Emergency Classification System) Rev 14-5 December 2014**

BLOCK 1

Page D-20 for 4.2.U.5-2 changed from "Selective Signaling" to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, includes information on how to operate DEMNET.

DEMNET was incorporated to remove the Selective Signaling System and on the use of the new communication network, for making emergency notifications to off-site agencies by initiating group calls to the government agencies using DEMNET "~~MSN~~ Notify".

MNS KLM 11.3.14

Planning Standards 50.47(b)(5) and 50.47(b)(6), are impacted by the new DEMNET process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope:

BLOCK 2

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical
☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval
☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☒ **§50.47(b)(5) – Notification Methods and Procedures***
☒ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☐ §50.47(b)(8) – Emergency Facility and Equipment
☐ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Screening Evaluation Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Randy Gibson		9-22-14
Reviewer Name:	**Reviewer Signature**	**Date:**
Marc Mullen		10/23/14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: Emergency Plan Section D (Emergency Classification System) Rev 14-5 December 2014

BLOCK 1

On page D-20 for 4.2.U.5-2 changed "Selective Signaling to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

New Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, will also be issued. The new Fleet procedure includes information on how to operate DEMNET.

DEMNET changes were incorporated to remove the Selective Signaling System and add instructions on the use of the new communication network, DEMNET. Step details for using the old Selective Signaling system were deleted or replaced with instructions for using DEMNET. Step details for using DEMNET include the following: Initiating group calls to the government agencies with the DEMNET "MSN Notify" button, use of the Alternate DEMNET buttons, and notes containing supplemental information. MWS 10-28-14

Additional information regarding this change:

The Selective Signaling emergency communications system has been the primary method of prompt communication to State and local Offsite Response Organizations (OROs) from the McGuire Nuclear Station (MNS) for many years. Within the confines of MNS, Selective Signaling operates as part of the normal plant communications system (i.e. internal extensions, commercial phones, etc.). Beyond the boundaries of MNS, Selective Signaling transmits over analog lines that are leased from local telephone providers. In the past, these lines have been subject to damage by natural and man-made causes or other failures such that all or part of communication ability of MNS to or from some or all of the OROs via Selective Signaling has been lost for various periods of time.

Since Selective Signaling is an unmonitored system, it is typically not known that problems exist until the system is used (i.e., during periodic testing, communication checks, drills, etc.). When problems are identified and reported, it is up to the local telephone provider to determine when the repair(s) can be made. In addition to the less than reliable service for the Selective Signaling system, Duke Energy has been notified by local telephone providers that due to the frequency of failures and the ever increasing difficulty in obtaining repair parts / materials, they will no longer be able to provide repair / maintenance support of the antiquated system beyond 2014.

As a solution for this, Duke Energy has selected Emergency Management Network (EMnet) as provided by the vendor, Communications Laboratories (Comlabs). EMnet is currently in use by a number of Federal, State, and local government agencies, and is being implemented by an increasing number of nuclear stations / utilities. EMnet will be referenced as DEMNET for the remainder of this evaluation. Comlabs provides hardware, software, training, installation and other services necessary for DEMNET to operate. DEMNET is being implemented across the Duke Energy Fleet as a replacement for Selective Signaling.

DEMNET allows the Control Room, Technical Support Center (TSC), Emergency Operations Center (EOF), and alternative response facilities to communicate with Offsite Response Organizations and/or with each other using VoIP (voice-over-internet protocol) as the primary method. In the event of internet related problems (i.e., slow data transfer rate, unavailability, etc.), the system automatically transfers to satellite communication as a backup. Like Selective Signaling, DEMNET allows internal and external point-to-point contact between individual stations as well as simultaneous conferencing with multiple stations. This ability is a valuable backup to existing telephone circuits. The point-to-point

capability also allows DEMNET to continue to provide Decision Line capability, which enables ORO decision makers to use the system to discuss public protective actions over dedicated / controlled access communication links.

Via the dedicated DEMNET computer, historical and real-time system status can be readily determined. DEMNET is also monitored by the vendor, Comlabs. This allows for a more proactive approach in identification and resolution of problems associated with the system should they occur. In the event of failure, the application of suitable compensatory measures (i.e., use of back up communications) can be made in a more efficient and effective manner.

No changes are made to the communications systems that currently serve as a backup to Selective Signaling or the associated implementation process(es) for employing them.

DEMNET equipment installed and operated at Duke Energy nuclear plants and support facilities is installed and maintained to meet cyber security requirements in accordance with 10 CFR 73.54 and other related guidance.

As part of the installation process, DEMNET has been extensively tested to ensure connectivity / operability before being placed in service. Duke Energy Emergency Response Organization and Emergency Preparedness, along with personnel from Offsite Response Organizations have received training on the new system as well.

As configured, the network that DEMNET resides within MNS causes the system to be powered from various sources based upon the physical location of the individual components within the network. In the event normal and/or backup power supplies become unavailable, and as a result, DEMNET and all other backup communications system become non-functional, MNS and the OROs have a number of battery powered portable satellite phones available that can be placed into service in an effort to maintain the capability of providing prompt communications between MNS and the OROs.

Upon implementation across the Duke Energy Fleet and its State and local Offsite Response Organizations, the product name "EMNet" is replaced with the new system name "Duke Emergency Management Network (DEMNET)". The name "Selective Signaling" will no longer be used, while the name "Decision Line" will continue to be used.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*
☐ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

- 10 CFR 50.47(b)(5) - Notification Methods and Procedures (Risk Significant Planning Standard) states: "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

  The applicable emergency planning function associated with 10 CFR 50.47(b)(5) states: "Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications."

- 10 CFR 50.47(b)(6) – Emergency Communications states: "Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The applicable emergency planning functions associated with 10 CFR 50.47(b)(6) state:
- Systems are established for prompt communication among principal emergency response organizations.
- Systems are established for prompt communication to emergency response personnel

Licensing Basis:

This evaluation included a search of McGuire Nuclear Station (MNS) licensing basis documents for references to the Selective Signaling system. The search concluded that a review of the Duke Energy McGuire Nuclear Station (MNS) Emergency Plan was warranted.

While the MNS Emergency Plan contains several references to Selective Signaling, there are no details within the Emergency Plan regarding usage of the system, other than to indicate that it is the primary system used for prompt communications to the offsite response organizations. DEMNET is replacing Selective Signaling as the primary system used for prompt communications to the offsite response organizations.

Other references within the MNS Emergency Plan include facility diagrams which indicate the location of Selective Signaling telephones. DEMNET equipment is replacing Selective Signaling in each location where Selective Signaling was present.

The MNS Emergency Plan also references periodic testing of Selective Signaling. DEMNET will be tested in a similar manner and frequency as was Selective Signaling.

Consequently, the replacement of the Selective Signaling system with DEMNET within the MNS Emergency Plan will constitute a name change only.

This review concludes that changes to this document relative to the replacement of Selective Signaling with DEMNET do not affect the licensing basis of the MNS Emergency Plan. The changes in this revision support replacement of the Selective Signaling telephone system, which is used for notifications to state/county agencies, with a new dedicated telephone system called the Duke Emergency Management Network (DEMNET). These changes support a Duke Energy fleet-wide initiative to upgrade the dedicated telephone system for notifying state/county agencies of a declared emergency as an overall enhancement to emergency preparedness. These changes meet or exceed all emergency preparedness requirements based on NRC regulations and requirements.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

10 CFR Part 50, Appendix E, Section IV.D.1 states the following:
Administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary, shall be described. This description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs.

10 CFR Part 50, Appendix E, Section IV.D.3 states the following, in part:
A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate ...

10 CFR Part 50, Appendix E, Section IV.E.8.d states the following, in part:
For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: ... the capability to perform offsite notifications; ....

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 2.7, states, in part:
The TSC voice communication equipment shall include:
- Hotline telephone ...
- Dedicated telephone ...
- Dial telephones ...

- Intercommunications systems ...
- Communications ... to State and local operations center prior to EOF activation.

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 4.6, states, in part:
The EOF shall have reliable voice communications facilities to the TSC, the control room, NRC, and State and local emergency operations centers. The normal communication path between the EOF and the control room will be through the TSC. The primary functions of the EOF voice communications facilities will be:

- EOF management ...
- Communications ...
- Communications ...
- Communications to coordinate offsite emergency response activities, and
- Communications ... .

NUREG-0654 (Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants), Section II.F, states, in part:

1. The communications plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local, and State response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:

   a. provision for 24-hour per day notification to and activation of the State/local emergency response network; and at a minimum, a telephone link and alternate, including 24-hour per day manning of communications links that initiate emergency response actions.

   b. provision for communications with contiguous State/local governments within the Emergency Planning Zones;

   c. provision for communications ...

   d. provision for communications ...

   e. provision for alerting or activating emergency personnel in each response organization; and provision for communication ...

The replacement of Selective Signaling and Decision Line (SS/DL) with DEMNET continues to comply with applicable regulations and commitments by providing a dedicated method of contacting State and local authorities in a timely manner during an emergency.

Compliance is maintained in the following manner:

1. DEMNET is a dedicated system for communication with OROs that is capable of establishing contact within 15 minutes of emergency declaration. This is consistent with the capability of the SS/DL system.

2. DEMNET stations are present in the Control Room, TSC, EOF, and alternative facilities which are capable of initiating or receiving point-to-point or conference calls with any ORO site similarly equipped. This is consistent with the capability of the SS/DL system.

3. Compatible DEMNET stations are installed in all ORO locations that were serviced by the SS/DL system.

4. The TSC has an DEMNET station to allow communication with State and local OROs prior to EOF activation. This capability existed with the existing SS/DL system.

5. DEMNET is a voice communications system with dedicated stations located in the Control Room, TSC, EOF, alternative facilities, and State/local emergency operations centers and is capable of coordinating

offsite response activities via point-to-point or conference calling. Communications with NRC is conducted using a separate system unrelated to DEMNET. This is consistent with the SS/DL system.

NOTE: In addition to voice communications, DEMNET is also capable of transmitting data. The voice communications feature of DEMNET is the replacement for SS/DL voice communications capability.

6. DEMNET has redundant features to maintain communication capability in the event of system failure or degradation. During normal operation, DEMNET employs voice-over-internet protocol (VoIP) technology to establish contact between stations. Should internet problems (unavailability, slow transfer rate, etc.) occur, the system will automatically shift to satellite communication as a backup. This backup feature is an enhancement that SS/DL did not have. Failure of the SS/DL system required the use of the commercial telephone system to re-establish communications.

7. By locating an DEMNET station in the continuously staffed Control Room, the licensee provides 24-hour per day capability to establish links to initiate emergency response actions.

8. DEMNET stations are established at each contiguous State/local emergency response agency within the EPZ. This is consistent with the usage of the SS/DL system.

- 10 CFR 50.47(b)(5) states the following:

"Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

The function of this planning standard pertinent to this change is the establishment of procedures for State and local governmental agencies that are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

- 10 CFR 50.47(b)(6) states the following:

"Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The function of this planning standard pertinent to the change is that systems be established for prompt communications among principal response organizations.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:
The screening of this change has identified two (2) affected planning standard functions described above:

1. Procedures for notification of State and local government agencies are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

Additional procedures are currently in effect for notification of State and local agencies following a declared emergency. These procedures explicitly require that such notification occur within 15 minutes of emergency declaration.

Station procedures were originally intended to address notifications using the Selective

Signaling/Decision Line (SS/DL) system and have likewise been revised to address the change to DEMNET. The functionality and utility of the procedures remain unaffected by the proposed change. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

2. Systems are established for prompt communication to emergency response personnel.

   The SS/DL system suffered from obsolescence and eroding vendor support. The communications carriers currently providing service for the system informed the licensee that all support will terminate at the end of 2014. This prompted the change to DEMNET, a communications system widely used in the emergency response community.

   As described above, DEMNET possesses all of the capabilities of SS/DL with additional enhancements not found in the former system. Significant among these is the use of robust VoIP technology and automatic "failover" to satellite communications in the event of a failure or degradation of the primary internet flowpath. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

   The evaluation concludes that the change does not impact either applicable planning function negatively and therefore does not constitute a reduction in effectiveness.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/22/14
Reviewer Name: Marc Mullen	Reviewer Signature	Date: 10/23/14
Approver Name: **Kevin L. Murray**	Approver Signature K.L. Murray	Date: 11-11-14

§50.54(q) Screening Evaluation Form **Activity Description and References**: **BLOCK 1**

MNS Emergency Plan Section D (Emergency Classification System) Rev 14-5 December 2014 Click here to enter text.

Pages D-26, D-27, D-29 and D-30 - Deleted procedures HP/0/B/1009/029 and SH/0/B/2005/001 and replaced with AD-EP-ALL-0202.

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites.

Planning Standards 50.47(b)(1), 50.47(b)(8) and 50.47(b)(9), are impacted by the new URI process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical

☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval

☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☒ §50.47(b)(8) – Emergency Facility and Equipment
☒ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination:	**BLOCK 6**
☐ The activity does involve a site specific EP commitment Record the commitment or commitment reference: _____ ☒ The activity does not involve a site specific EP commitment	
Screening Evaluation Results:	**BLOCK 7**
☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation ☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation	

Preparer Name:	Preparer Signature	Date:
Randy Gibson	RJG	9/24/14
Reviewer Name:	**Reviewer Signature**	**Date:**
MARC Mulkey	Marc Mulkey	10/23/14

50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section D (Emergency Classification System) Rev 14-5 December 2014 BLOCK 1

Pages D-26, D-27, D-29 and D-30 - Deleted procedures HP/0/B/1009/029 and SH/0/B/2005/001 and replaced with AD-EP-ALL-0202.

To support a Duke Energy fleetwide initiative, replacing instructions associated with the RADDOSE dose assessment tool with Unified RASCAL Interface (URI).

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites. As a result, specific site procedures for performing dose projections are superseded by AD-EP-ALL-0202.

Additional information supporting this change:

RADDOSE is the current application used for dose assessment and projection of radiological releases during an emergency. The proposed change will replace RADDOSE with the Unified RASCAL Interface (URI) as the standard fleet-wide dose assessment tool.

RADDOSE is designed to estimate dose rates and deposition rates at 15-minute time intervals. From these estimates, integrated doses (using EPA 400-R-92-001 (EPA-400)[14] dose factors and methodologies) and total deposition are calculated for the length of time covering the release of radioisotopes.
Doses are determined at radial grid and special receptor locations in the Plume Exposure Pathway Emergency Planning Zone while deposition is calculated to fifty miles surrounding the facility, based on radiological and meteorological data collected at the plant.

The RADDOSE model is designed to provide real-time (as the release is occurring) and projected site specific predictions of atmospheric transport and diffusion as required by NUREG-0654, Revision 1, Appendix. Atmospheric transport and diffusion are performed using a variable trajectory plume simulation model along with realtime meteorological data entered either directly from the PI server or manually. Likewise, the source term component of RADDOSE uses plant specific radiological data, for a number of accident types, entered via the PI server or manually. Using this information along with EPA-400 dose conversion factors, the model determines dose rates, doses, deposition rates and total deposition.

URI is a computer code intended for use at nuclear generating stations and other emergency response facilities in the event of an actual or potential release of airborne radioactivity to the environment at levels warranting declaration of an Emergency specified in the Radiological Emergency Plan. URI is a replacement for the user interface normally delivered with the computer code Radiological Assessment System for Consequence AnaLysis ("RASCAL") maintained and distributed by the by the Nuclear Regulatory Commission (NRC).

The URI program:

- Provides a user interface specifically designed for users for nuclear power station events.
- Allows input of all required dose assessment model parameters including meteorological data, plant effluent monitor data, and plant condition and status.

- Develops source terms based on user input.
- Creates RASCAL data files based on the specific user input
- Invokes the RASCAL met data processor, plume model processor, and puff model processors.
- Reads and interprets RASCAL results files and provide reports to the user of doses, affected areas, and other information relevant to emergency plan implementation.

The code has three modes: Rapid Assessment, Detailed Assessment, and Sum Assessment. Rapid Assessment enables on-shift staff to meet regulatory requirements for quick, simplified dose assessments in the initial phases of an event. Detailed Assessment enables the Emergency Response Organization staff to make more detailed dose assessments. Sum Assessment adds multiple concurrent assessment results.

Because certain aspects of the interface must be site or unit specific, particularly the release pathways, separate programs are used for each unit, or when possible, multi-unit site if the units are identical. The majority of the code forms and modules are common to all these separate programs, with the pathways and site specific setup parameters different for each site / unit.

The program utilizes two types of data:

- User inputs
- Constants stored in external encrypted xml format files unique to each site.

User inputs are values needed to run dose assessments that vary from assessment to assessment. These would consist of items such as meteorological data and effluent monitor readings.

Constants are values set internally by the system administrators. These would consist of items such as site boundary distances and monitor response factors that define the site and do not change for each assessment. A separate computer program called "Interface Maintenance" is used to control and generate these constants and maintain the SQL data table files that these constants are stored in. The URI computer programs cannot change constant values or their related encrypted xml files.

The dose assessment computer programs will only be run when a user needs to perform a dose assessment. The code does not generate any data that needs to be retained by the program after an assessment is completed, though reports can be printed or saved to individual files for later retrieval if required.

There are no interfaces with plant safety systems.

The URI programs are specifically designed to interface with versions 4.0 to 4.2 of the NRC computer program RASCAL. It is expected that future revisions will remain compatible but would need to be verified for each new RASCAL release. RASCAL is designed to produce emergency release dose assessments. RASCAL communicates between its own separate modules (.exe and .dll modules) using ASCII text data files. The URI programs interface with RASCAL by creating the same data files in the same format based on the information stored in the xml data tables and the user input. These RASCAL data files are modified or retrieved 'on-the-fly' for each assessment performed.

Activity Type: **BLOCK 2**

☐ The activity is a *change* to the *emergency plan*
☒ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

10 CFR 50.47(b)(8) states: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained."

The emergency planning functions associated with 10 CFR 50.47(b)(8) state:

- Adequate facilities are maintained to support emergency response.
- Adequate equipment is maintained to support emergency response.

The applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E states (in part): Adequate provisions shall be made and described for emergency facilities and equipment, including:
2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.H.8 states:

Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.

10 CFR 50.47(b)(9) states: "Adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use."

The emergency planning function associated with 10 CFR 50.47(b)(9) states:

- Methods, systems and equipment for assessment of radioactive releases are in use.

The applicable supporting requirements which are described in 10 CFR 50, Appendix E state:

Section IV.B (in part):

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described,

Section IV.E (in part):

Adequate provisions shall be made and described for emergency facilities and equipment, including:

2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.I states (in part):

8. Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment and estimated deployment times.

9. Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} uCi/cc (microcuries per cubic centimeter) under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detected activity.

The applicable informing criteria described in NUREG-0696, Section 4.8 states (in part):

The EOF technical data system will receive, store, process and display information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data providing information...

The EOF data set shall include radiological, meteorological, and other environmental data needed to:

- Assess environmental conditions,
- Coordinate radiological monitoring activities, and
- Recommend implementation of offsite emergency plans.

Licensing Basis:

This evaluation included a search of MNS licensing basis documents for references to Dose Assessment, and

specifically for references to RADDOSE-V. The search concluded that while the dose assessment function is discussed, specific references to the dose assessment tool and how to perform dose assessments are not discussed. As a result, the MNS licensing basis is not impacted by the change to replace RADDOSE-V with URI as the dose assessment tool. The change is which supports replacement of RADDOSE V with URI and is strictly administrative and does not affect the licensing basis.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

The replacement of RADDOSE with URI will continue to comply with applicable regulations and commitments by providing a means of assessing offsite radiation dose during an emergency.

Compliance with the requirements identified above is maintained in the following manner:

Item 1

URI uses plant effluent monitor values and meteorological instrumentation input for the calculation of dose assessment results. These results are then used to determine the environmental impact of radioactive material releases and to direct the activities of field monitoring teams in plume tracking. Licensee emergency response personnel also use the assessment results to make protective action recommendations to state and local authorities. These features of URI are consistent with the current capabilities of RADDOSE.

RADDOSE employs an automatic data download from selected meteorological and radiation monitoring instrumentation to make dose projections. Typically, these downloads occur at 15-minute intervals. The user performing the assessment is responsible for validating the downloaded information against current plant conditions. While URI has no provision for automatic data downloading, it does allow the user to "drag and drop" meteorological and radiation parameters into the fields used by the application. This does not result in a significant delay since most of the time spent for data input in both RADDOSE and URI is for data validation. Field syntax restrictions reject out-of-range data to prevent erroneous information from being used in projection calculations. This feature, coupled with continual validation by the user, minimizes the risk of incorrect data entry.

Item 2

The portion of this requirement pertinent to the proposed change is that the licensee provide the method to perform rapid radiological assessments.

RADDOSE uses a Gaussian dispersion model and employs dose conversion factors taken from EPA 400, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*. URI uses a similar model with the same dose conversion factors. Empirical comparisons of both applications yield similar dose projection results when subjected to the same radiological and meteorological conditions. Calculation time of both applications is approximately the same. In addition, RASCAL (the underlying calculational base of URI) is sanctioned by the NRC and accepted as an industry standard application for dose projection.

Item 3

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of how offsite dose projections are made. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

Item 4

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of the equipment used for assessing the impact of the release of radioactive materials to the environment. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

The replacement of the Raddose-V dose assessment tool with URI involved rigorous testing and walkdowns to ensure the tool was ready for implementation. Duke Energy and the URI vendor performed a Validation and

Verification of the program to support implementation of the change. In addition, MNS ERO members qualified in dose projections received training on the changes and differences in dose projection methodology between RADDOSE-V and URI. This change to replace Raddose-V with URI does not change intent. This change supports the Duke Energy fleetwide initiative to replace the dose projection tool used for dose assessment and for protective action decision-making at all nuclear sites with an enhanced and improved methodology. The fleet procedure AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment" will now provide MNS dose assessment personnel with instructions for performing dose projections at the MNS site. The implementation of AD-EP-ALL-0202 ensures the correct software program for performing dose projections is used. This change continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

The change which supports the replacement of Raddose-V with URI is strictly administrative and continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:

The screening of the change from Raddose-V to URI identified two affected emergency planning functions associated with 10 CFR 50.47(b)(8) and 10 CFR 50.47(b)(9), as described above in the Impact and Licensing Basis Determination.

The change replaces RADDOSE with URI as the principal dose assessment tool. While the user interface for URI differs from that of RADDOSE, the assessment methodologies of both applications are essentially the same. Both employ the same dose conversion factors for determining source term dose. Both applications also use similar meteorological models of Gaussian plume dispersion.

URI provides a site specific overlay on the existing RASCAL meteorological, dispersion, and dose assessment models for all required input for emergency dose assessment as well as reports and plume graphics. Using the URI interface, the user does not interact with any part of the original RASCAL input or output screens.

Three of the primary purposes of URI are to make an interface that includes significant additional site specific processes (e.g. site specific effluent monitors), to simplify the input process for the user, and to use an industry common dose assessment model.

URI operates by providing a single input / result display form with non-serial input, and uses a 'pathway' release condition process rather than requiring the user to answer repetitive questions about the release. By selecting a 'pathway', options are set including default meteorological towers, release heights, applicable effluent monitors, etc. to limit the number of sequential questions the user must answer and to prevent selections that do not match. While all emergency effluent dose assessment systems require similar information (met data, isotopic mix, release magnitude), URI minimizes the effort required and significantly limits the opportunity for inappropriate selections. Options selections are defined for each specific pathway, which both prevent inappropriate selections and highlight to the user the available options for defining the engineered active and passive particulate and iodine removal processes that affect the mix appropriate for the selected pathway.

Numerous additional reports, data displays, etc. are provided for details when needed. Plume plots are provided, and a graphical display of areas exceeding the protective action guideline (PAG) limit is available. The PAG graphic can be based on either the standard 16 sectors and 3 distances or on geo-political emergency response areas.

One distinction between RADDOSE and URI deals with the identification of protective action recommendations (PARs). A feature of RADDOSE automatically flags the user when a dose projection determines that a PAR

threshold has been met. The user is then expected to refer to approved procedures to confirm the validity of this indication. Experience has shown that the automatic feature can be misleading under certain conditions and has led to incorrect PAR recommendations, particularly when the dose projection was performed by a less experienced user.

URI does not have this automatic flagging feature. PAR determination is made solely on approved procedural guidance without reliance on a potentially misleading indication.

Multiple options for source term basis are provided including monitored with single channel effluent monitors, monitored with multi-channel group monitors, or release point samples, and numerous unmonitored options including containment high radiation monitors, containment leakrate without monitors, RCS leakrate, or field team back calculation.

Three assessment methods are provided; a "Detailed" option for more experienced users, a "Rapid" option that makes more fundamental assumptions that is intended for immediate on-shift response, and a "Summation" option that allows for adding multiple concurrent releases. While the "Detailed" and "Rapid" options are consistent with current RASCAL assessment modes, the "Summation" option is an enhancement resulting from Fukushima experience.

The URI application, using site-specific inputs, has been evaluated against the software quality assurance criteria of NSD-800. Comparison of test cases for RADDOSE and URI show consistently satisfactory results. The two applications showed no significant difference in the timeliness or accuracy of dose assessment information.

In summary, URI is characterized by:

- a user-friendly input interface,
- graphical overlays displaying projected plume paths and dose values,
- the ability to perform dose projections using multiple simultaneous releases, and
- wide acceptance by both the industry and the NRC as an effective dose assessment application.

The change does not result in a reduction in effectiveness of facilities, response organizations, or response equipment. This change is strictly administrative and does not change intent. This change supports the replacement of the RADDOSE dose assessment tool with Unified RASCAL Interface (URI). This change does not affect the timeliness, accuracy or capability to determine or process dose projections and supports a fleetwide initiative to align dose assessment tools at all Duke Energy nuclear plant sites.

This change does not affect the emergency planning functions associated with 10 CFR 50.47(b)(8), because this change continues to ensure that adequate facilities and equipment are maintained at MNS to support emergency response, including equipment used for performing dose projections. This change does not affect the applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E, because this change continues to ensure that adequate provisions shall be made and described for emergency facilities and equipment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.H.8.

This change does not affect the emergency planning function associated with 10 CFR 50.47(b)(9), because the change continues to ensure that methods, systems, and equipment for assessment of radioactive releases are in use at MNS. This change does not affect the applicable supporting requirement described in 10 CFR 50, Appendix E.IV.B and E, because this change continues to ensure that equipment is available for determining magnitude and assessment of releases to the environment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.I (8-9) and NUREG-0696, Section 4.8.

As stated above, this change does not reduce the effectiveness of the MNS Emergency Plan. Instead, the change described in this revision continues to provide additional assurance that the ERO has the ability and capability to:

- respond to an emergency;
- perform functions in a timely manner;

- effectively identify and take measures to ensure protection of the public health and safety; and
- effectively use response equipment and emergency response procedures.

This change enhances ERO readiness to support a classified emergency, resulting in an improved capability to ensure health and safety of plant personnel and the general public. This change continues to meet NRC requirements, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

This change is an overall improvement to the MNS Emergency Preparedness Program.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/24/14
Reviewer Name: Marc Mulkay	Reviewer Signature	Date: 10/23/14
Approver Name: **Kevin L. Murray**	Approver Signature	Date: 11-11-14

H. Emergency Facilities and Equipment

H.1 Technical Support Center (TSC)/Operations Support Center (OSC)

H.1.a Control Room. The Control Room is utilized for evaluation and control of the initial phase of an emergency, including corrective actions and notification and activation of McGuire, Duke Energy, state and local emergency response organizations. The Control Room has redundant (telephone and alternate) two-way communications with emergency centers and off-site agencies. See Figure F-1 for communication scheme.

H.1.b Technical Support Center. (Figure H-1) The Technical Support Center (TSC) is utilized for evaluation of plant status by knowledgeable plant, vendor, NRC and other support groups during an emergency. This center will also be utilized to direct the on-site and initial off-site aspects of an emergency. Anticipated occupants are defined in Emergency Planning Group Manual Section 1.1, On-site Emergency Organization. The TSC has the following capabilities:

1. Redundant two-way communications with the Control Room, the OSC, the Emergency Operations Facility and the Nuclear Regulatory Commission Operations Center. See Figure F-2 for communication scheme.

2. Monitoring for direct radiation and airborne radioactive materials with local readout of radiation level and alarms if levels are exceeded.

3. Display, printout or trend record of comprehensive data necessary to monitor reactor system status and to evaluate plant system abnormalities, in-plant and off-site radiological parameters and meteorological parameters are available. This capability is provided via the operator aid computer. Capabilities to access and display parameters, individually or in groups is provided.

4. Ready access to as-built plant drawings such as general arrangements, flow diagrams, electrical one-lines, instrument details, etc.

5. Radiological habitability during postulated radiological accidents to the same degree as the Control Room.

6. Provisions for staffing by the Station Manager (Emergency Coordinator), advisors and representatives from the site as necessary. Room is also provided for NRC personnel. Space for up to 35 persons plus instrumentation displays are provided.

The TSC is located near the Control Room, on elevation 767, in the Service Building. The TSC is within one (1) minute walking distance from the Control Room. This is a permanent facility.

H.1.c Operations Support Center. (Figure H-2) The Operations Support Center (OSC) is that place designated for Operations, Radiation Protection, Chemistry, Maintenance, IAE, and others as necessary, to report to in an emergency condition. This center will be used to brief and prepare site personnel for work assignments in support of the emergency condition. The OSC is located on the Auxiliary Building roof office, elevation 784'. Workspace and resources are shared with the Outage Control Center (OCC). The OSC shall have priority over the OCC if any emergency is declared during an outage. The OSC has adequate capacity and supplies including provisions for respiratory protection, protective clothing, portable lighting, portable radiation monitoring equipment and communications equipment.

H.1.d Alternate Facilities. (Figures H-9 and H-10) Alternate TSC and OSC facilities have been established in the McGuire Admin Building as a contingency. Communications equipment similar to that provided in the designated TSC and OSC facilities is available but not all regulatory required equipment/capability is provided.

H.2 Emergency Operations Facility (EOF)

The Emergency Operations Facility (EOF) is utilized for direction and control of all emergency and recovery activities with emphasis on the coordination of off-site activities such as communications with local, state and federal agencies, and coordination of corporate and other outside support. Anticipated occupants are the EOF organization and appropriate state and federal agency representatives.

The EOF has the following capabilities:

a. The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves.

b. The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves.

c. The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site.

The Common EOF in Charlotte serves as an alternate facility that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and having the following characteristics required collectively of the alternate facilities for use when onsite emergency facilities cannot be safely accessed during hostile action:

- The capability for communication with the emergency operations facility, control room, and plant security.
- The capability to perform offsite notifications.
- The capability for engineering assessment activities, including damage control team planning and preparation.

The EOF has redundant two-way communications with the Technical Support Center and appropriate off-site support agencies. (See Section F).

The EOF is located at 526 South Church Street, Charlotte, NC in the Energy Center Phase I, first floor (ECI-0120 through 0134). The EOF layout and location are shown on Figures H-3 thru H-5.

The Joint Information Center and Media Center are utilized for the origination of news briefings and interviews. Anticipated staffing includes the News Group personnel, industry and government representatives and support personnel. News media personnel can be accommodated for press conferences, etc., in the Media Center. (See Figure H-6 and H-7.)

The Joint Information Center has two-way communications with the Emergency Operations Facility and corporate headquarters.

The Joint Information Center (JIC) is located in Duke's Energy Center, 526 South Church Street, Charlotte, N.C. The JIC is located on the first floor, room ECI-0172.

The facilities and resources in the JIC include:

- Work space
- Telephones
- Facsimile machines
- Copy machines
- Podium and PA system
- Tone alert radio
- TV monitor and VCR for real time viewing of the press conferences and taped review of news broadcasts from all three major networks
- Status board
- Wall charts dealing with nuclear site systems and evacuation zones
- Name tags
- Limited clerical support as needed
- Meals during long term activation
- Security escort to other JIC facilities as needed

The media center is located in Duke's Energy Center, 526 South Church Street, Charlotte, N.C. The center is located on the first floor in the O.J. Miller Auditorium.

The facilities and resources in the Media Center include:

- PA system and direct access to recording
- 18 telephones for news media
- Court recorders for prompt press conference transcripts
- Charts dealing with nuclear site systems and evacuation zones
- Modem/computer connections for the news media
- Overhead projector
- Slide projector
- Screen
- Press kits
- News releases
- Technical resources
- Security, registration and badging

H.3 State and Local Government Emergency Operations Centers

See County and State Plans.

H.4 Activation and Staffing

McGuire emergency centers (TSC, OSC) are activated as required by the appropriate Emergency Response Procedure. Activation of the TSC and OSC is required for Alert and above emergency conditions. Timely activation and staffing of the Emergency Operations Facility is important to allow the Nuclear Site staff the ability to correct the situation with minimal interference from outside organizations. The Emergency Coordinator will perform the role and function of the EOF Director until activation of the EOF has taken place. The EOF Organization will be alerted and staffed for Alert and higher emergency classifications. The EOF will be staffed using 75 minutes as a goal for the minimum staff to be in place and operational.

H.5 Assessment Actions

Onsite monitoring systems used to initiate emergency measures are defined in Section I. Those used for conducting assessment evaluations during any emergency condition are listed below:

H.5.a Meteorological. A description of the primary meteorological measurement facility is found in Appendix 2. These basic meteorological parameters are displayed in the Control Room, see Figure H-8, Generalized Meteorological System.

1. During periods of primary system unavailability, an alternate source of meteorological data is established as the NWS (NATIONAL WEATHER SERVICE) office. Wind direction and speed are from standard NWS instrumentation at conventional heights.

Wind direction from the NWS can replace the tower (40 m) wind direction. Wind speed from the NWS can replace the lower tower (10 m) wind speed for dose calculation purposes; it can also replace the tower (40 m) wind speed for transport speed considerations.

A monthly telephone contact, initiated by plant personnel, with the NWS office will be established to insure that this basic meteorological information can be accessed. See PT/0/A/4600/089.

2. The following field checks will be performed each week by plant personnel:

Wind Direction

(a) Recorder Time Accuracy
(b) Recorder Zero
(c) Translator Zero
(d) Translator Full Scale

Wind Speed

(a) Recorder Time Accuracy
(b) Recorder Zero
(c) Translator Zero
(d) Translator Full Scale

Delta - Temperature

(a) Recorder Time Accuracy

3. Onsite meteorological instruments will be calibrated at a frequency specified by Technical Specifications. During calibration periods, basic meteorological data, characteristic of site conditions, will be accessible from the NWS. These instruments will be calibrated in accordance with approved procedures.

Hydrologic

A hydrological description of the McGuire Nuclear Site is located in the MNS FSAR, Section 2.4.

Seismic

A description of the seismic monitoring instrumentation and area seismology studies are found in McGuire FSAR, Sections 3.7 and 2.5 respectively.

H.5.b Radiological Monitors

Radiological monitors including process monitors, area monitors, post-accident monitoring equipment, effluent monitors, personnel monitoring devices, portable monitors and sampling equipment are described in various Radiation Protection procedures, the McGuire FSAR, Emergency Plan Implementing Procedures and Safety Evaluation Report.

H.5.c. Plant Parameters

Equipment and instrumentation to monitor plant parameters such as reactor coolant pressure, temperature, levels, containment pressure, temperature, humidity, sump levels, hydrogen concentrations, system flow rates, status, line-ups, are included in operating and emergency procedures. Examples of specific instruments used for accident evaluation are given in Section I.

H.5.d Fire Detection

Fire detection devices of the ionization-chamber and thermal type are located throughout the site.

H.6 Data, Monitoring Equipment and Analysis Facilities

Provisions have been made and exist to obtain data from off-site agencies or monitoring equipment and analysis facilities. The provisions are described below:

a. Meteorological information is available from the National Weather Service as described in Section H.5.a. Monitoring of the Catawba River for hydrologic data is conducted within the Duke System of dams and hydro-electric facilities. Seismic data is available from the U.S. Geological Survey Office as provided for in the McGuire Procedure RP/0/A/5700/007 (Earthquake).

b. Radiological monitors for emergency environmental monitoring are provided in emergency kits. The established environmental monitoring network and sampling equipment in the surrounding area are also available to provide emergency assessment data. Environmental Radiological Monitoring equipment includes radioiodine and particulate continuous air samplers and thermoluminescent dosimeters. The thermoluminescent dosimeters are posted and collected in accordance with Table 1, Branch Technical Position, Rev. 1 of November, 1979. Emergency Planning Implementing Procedure, HP/0/B/1009/023 (Environmental Monitoring for Emergency Conditions) lists locations of posted thermoluminescent dosimeters and air samplers.

c. See Section C.3.

H.7 Offsite Radiological Monitoring

As described in H.6.b above.

H.8 Meteorology Instrumentation and Procedures

See Section H.5.a.

H.9 Operations Support Center

See Section H.1.c.

H.10 Emergency Equipment/Instrumentation Inspection, Inventory, Operational Check, Calibration

McGuire Procedure PT/0/A/4600/088, Functional Check of Emergency Vehicle and Equipment, defines the inspection, inventory and operational checks required of emergency equipment. Various Radiation Protection procedures define the criteria for calibration of all monitoring equipment located in the emergency kits.

H.11 Emergency Kits

Radiological Emergency kits are described in PT/0/A/4600/088, Functional Check of Emergency Vehicle and Equipment.

H.12 Receipt and Analysis of Field Monitoring Data

Duke Energy's Emergency Operations Facility (Radiological Assessment Manager) will be the central point for the receipt of off-site monitoring data results and sample media analysis results collected by Duke personnel. Resources exist within the organization to evaluate the information and make recommendations based upon the evaluations. The Radiological Assessment Manager's group will perform these evaluations and make recommendations to the EOF Director for protective actions. The EOF Director is the individual responsible for making protective action recommendations to off-site agencies after activation of the EOF.

FIGURE H-1

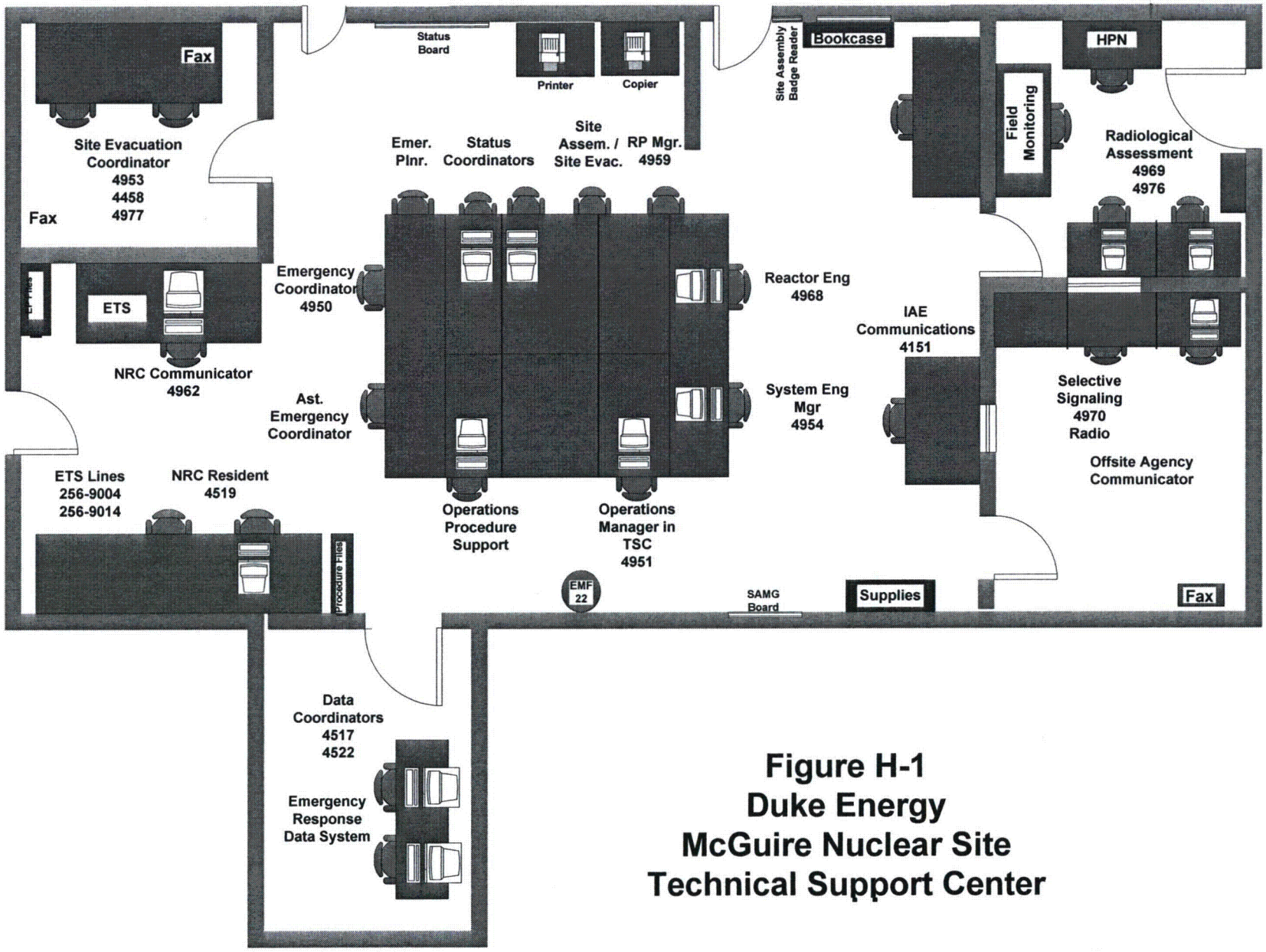


Figure H-1
Duke Energy
McGuire Nuclear Site
Technical Support Center

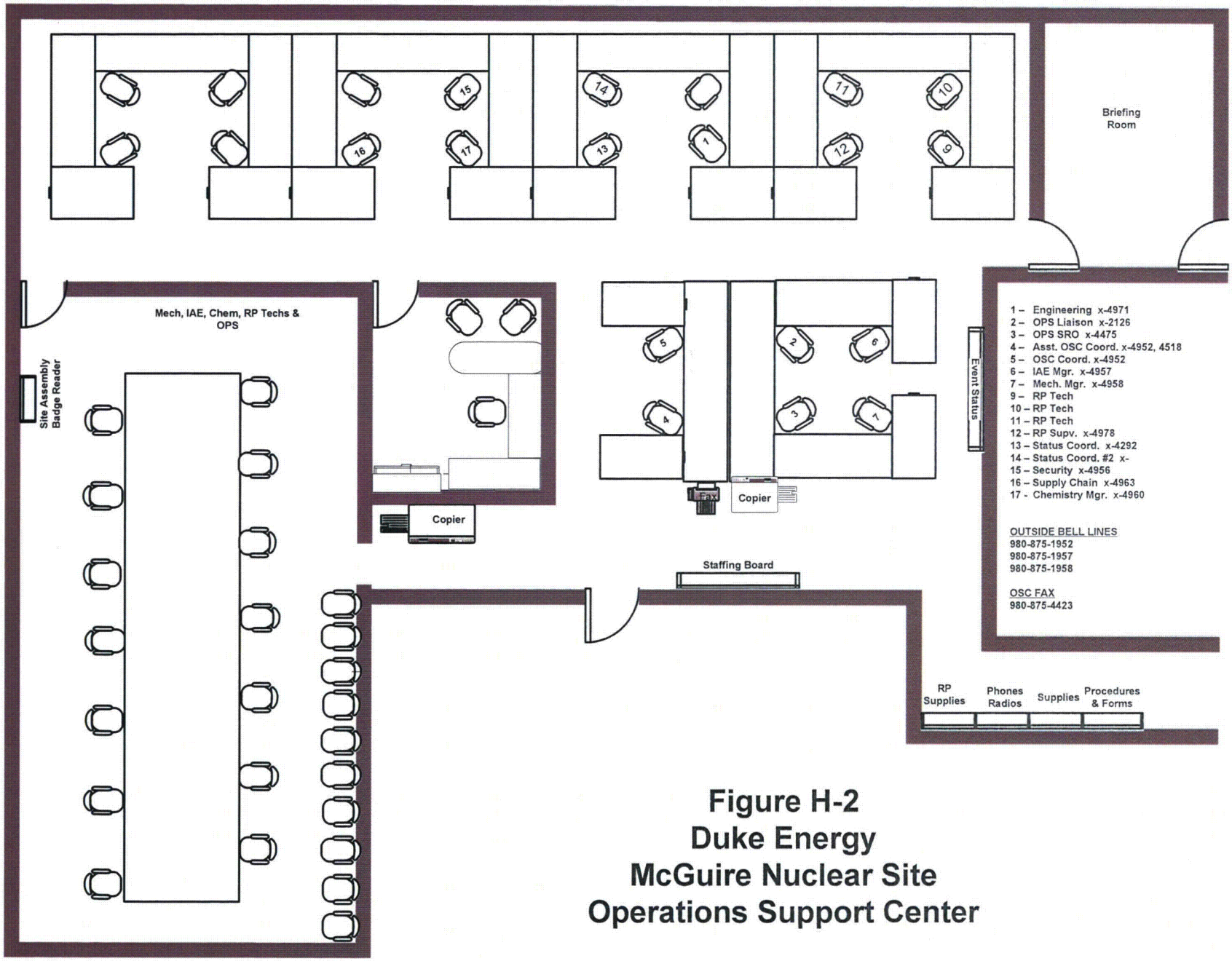


Figure H-2
Duke Energy
McGuire Nuclear Site
Operations Support Center

FIGURE H-3
DUKE ENERGY
EMERGENCY RESPONSE
MNS/CNS/ONS EOF
GENERAL LOCATION

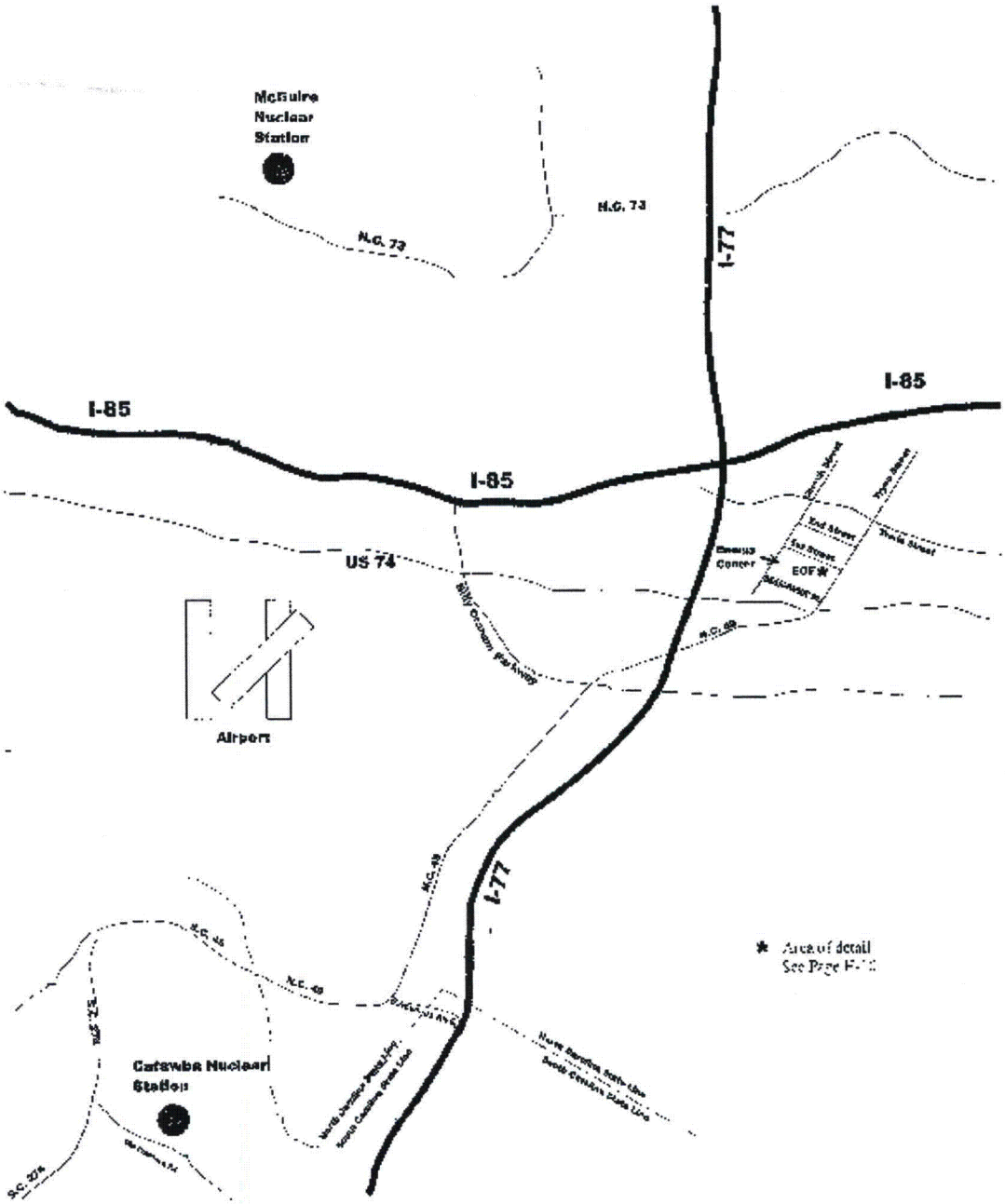
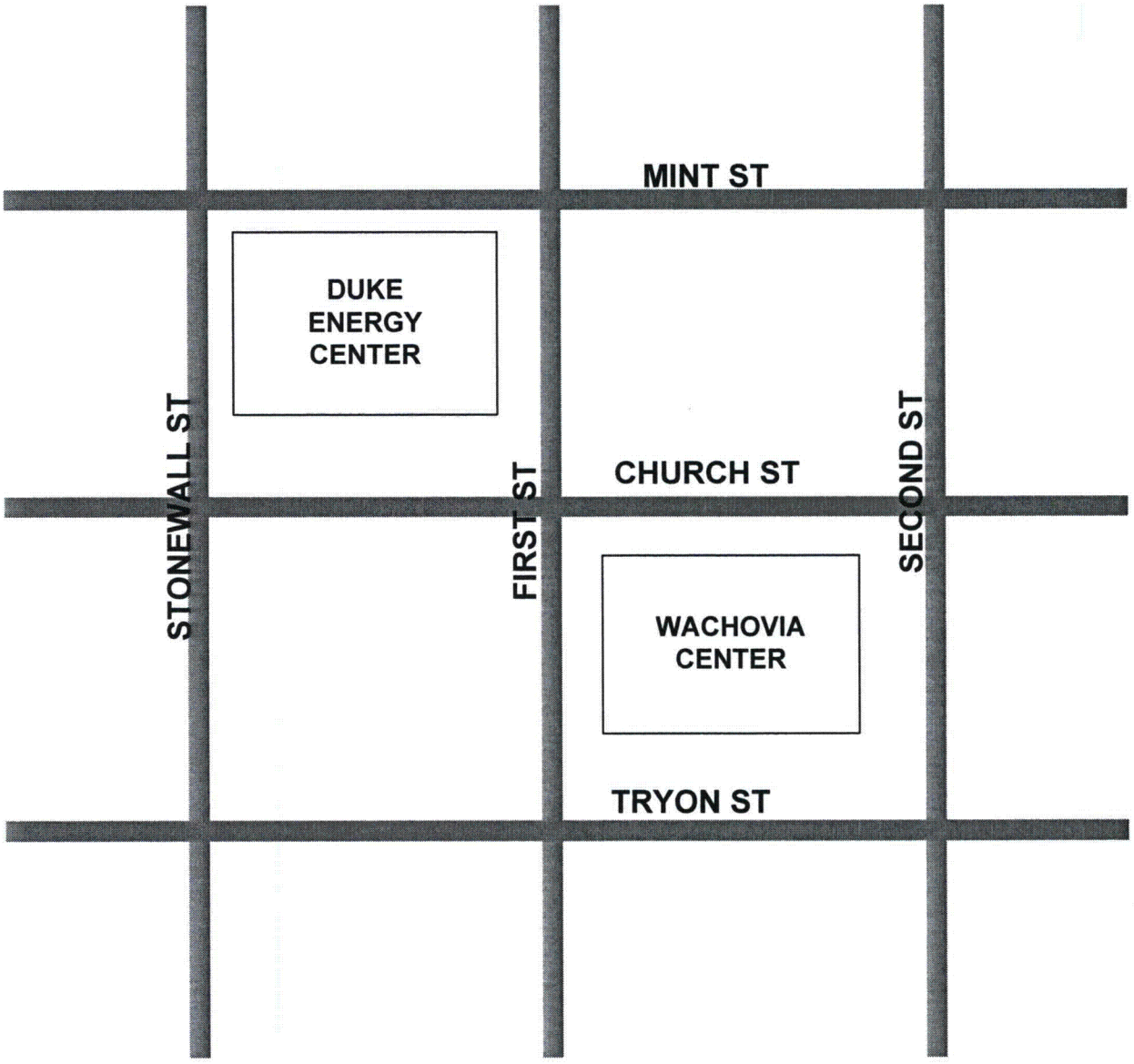


Figure H-4

DUKE ENERGY
GENERAL OFFICE RESPONSE
FACILITY

McGuire / Catawba / Oconee EOF

GENERAL OFFICE BUILDING LAYOUT - CHARLOTTE, NC



The EOF, Media Center and Joint Information Center are in the Energy Center on the 1st floor.

FIGURE H-5

Emergency Operations Facility

EOF GENERAL ARRANGEMENT

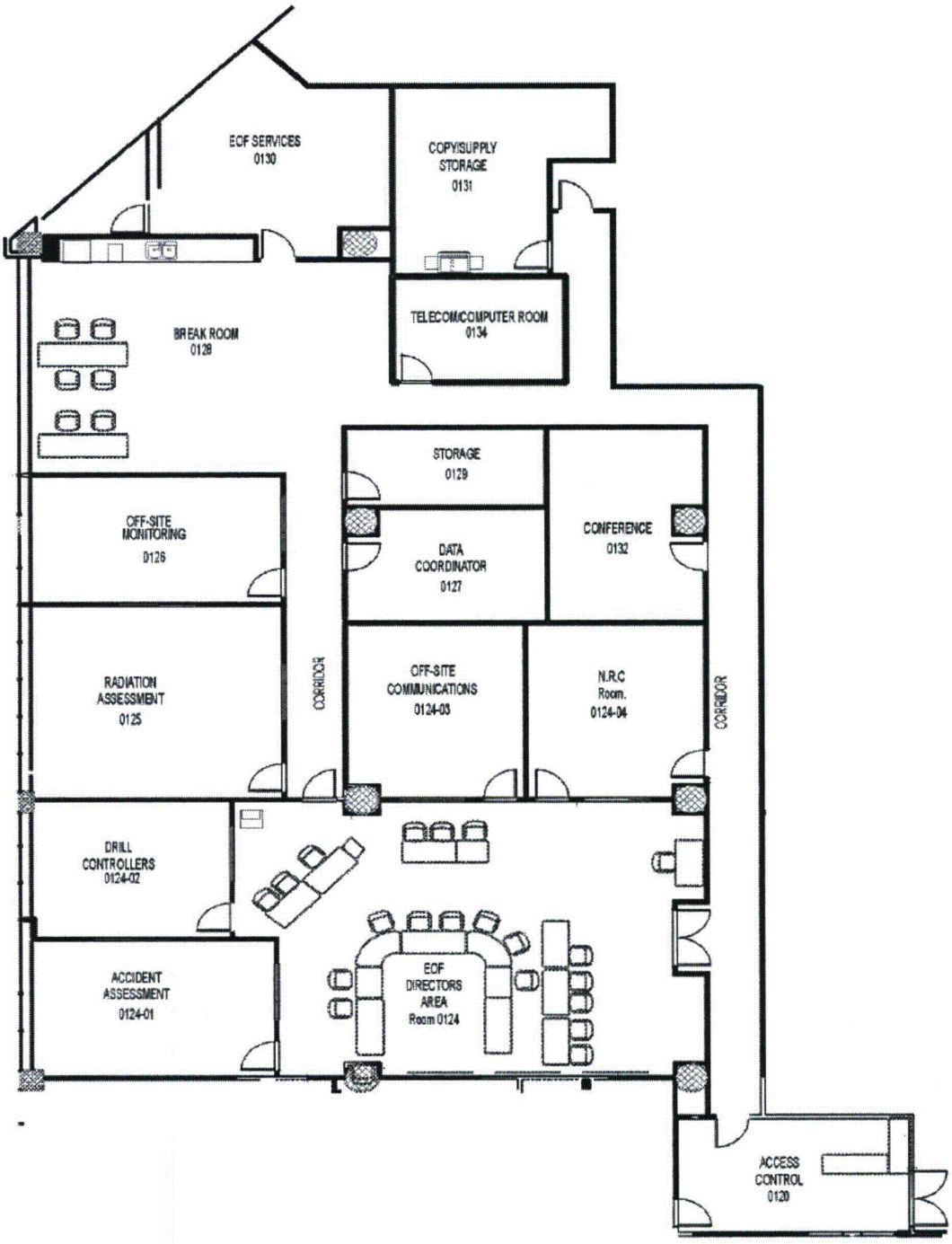


Figure H-5
Duke Energy
McGuire Nuclear Site

Figure H-6
Duke Energy
Media Center

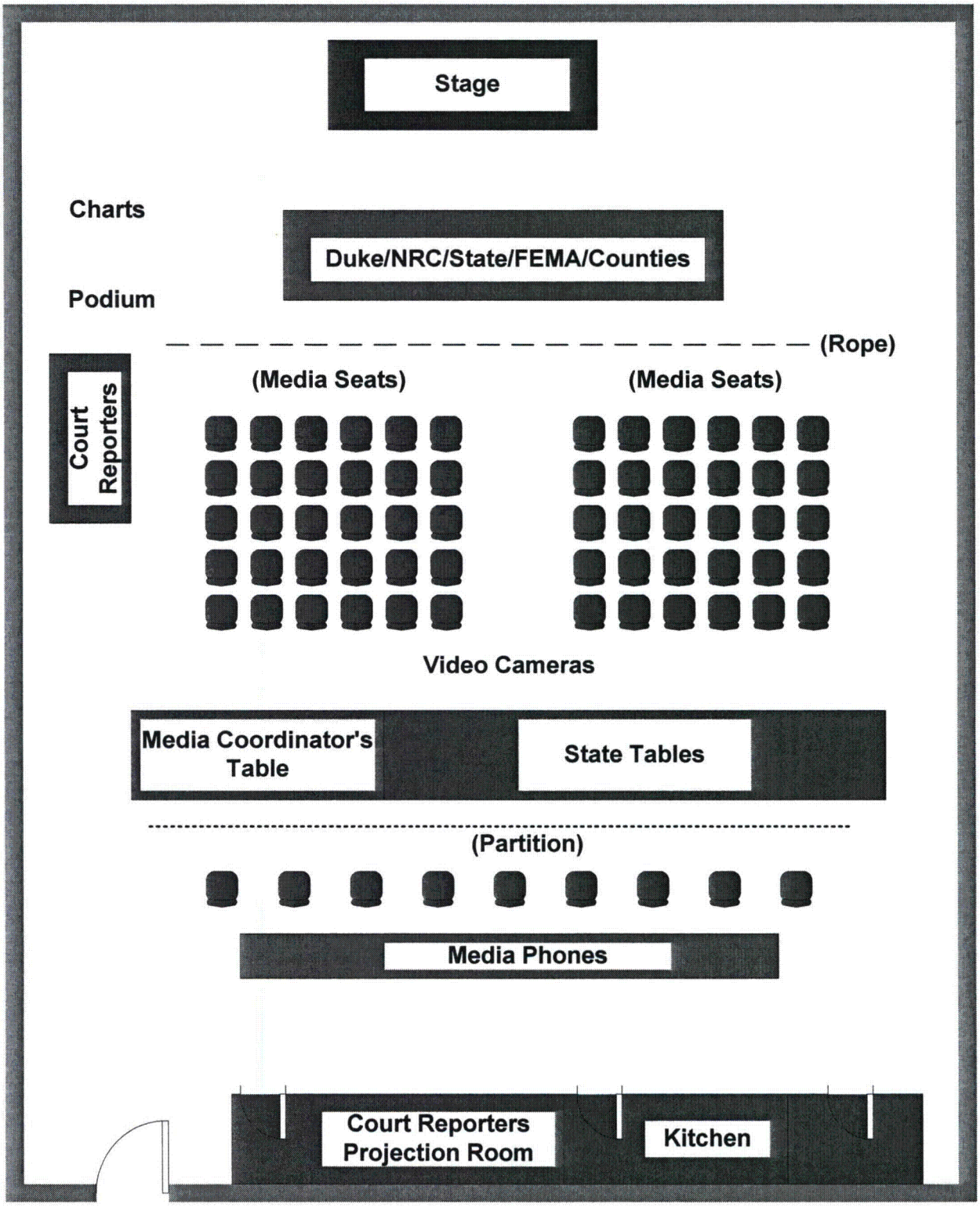


Figure H-7
Duke Energy
Joint Information Center

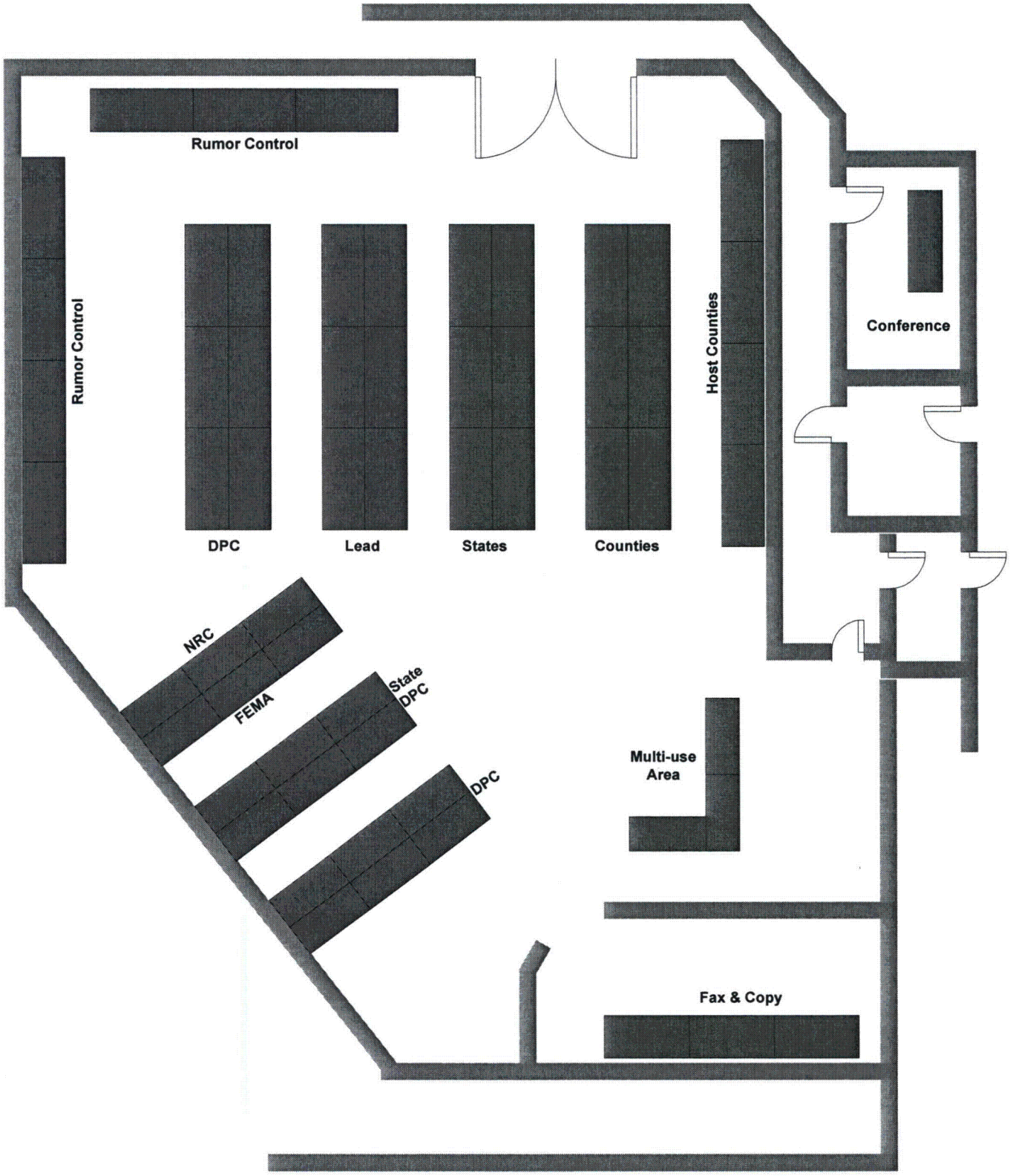


FIGURE H-8
McGuire and Catawba Nuclear Sites
Generalized Met System

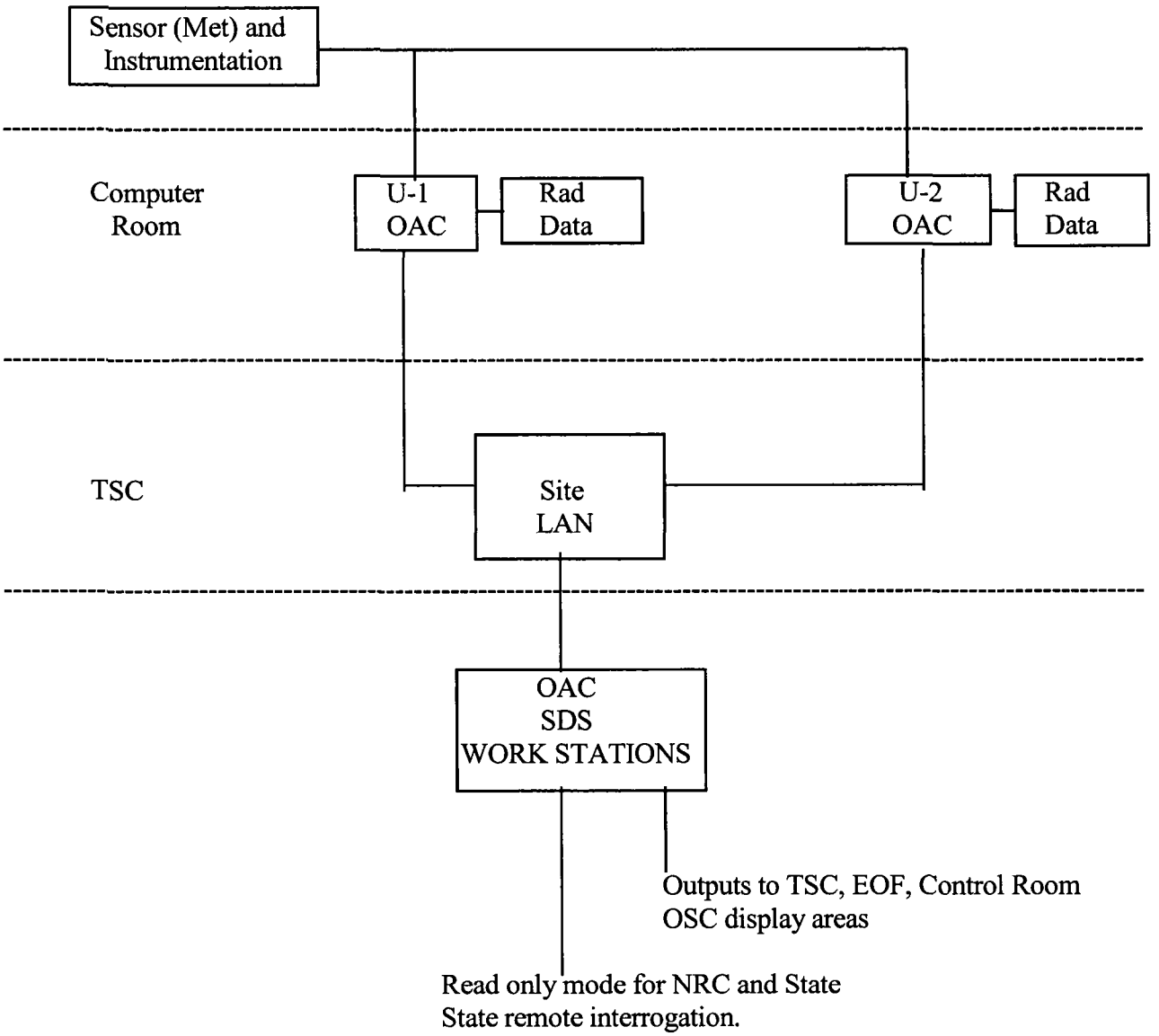
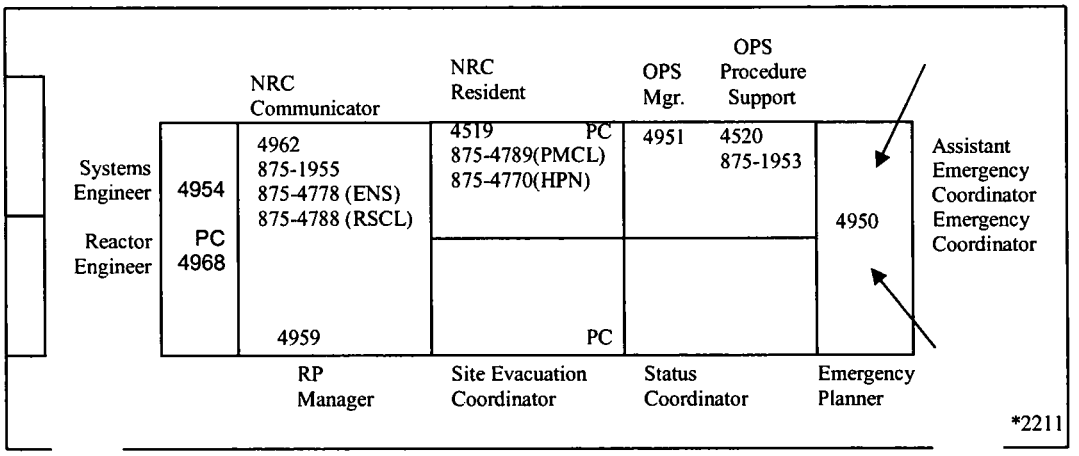


FIGURE H-9

MCGUIRE NUCLEAR SITE
ALTERNATE TECHNICAL SUPPORT CENTER
(EXECUTIVE BOARD ROOM, ROOM 111, ADMIN. BUILDING)



Other TSC Position Locations

- Site Evacuation Coordinator (EP Room 114) - *4458, *4977, *875-1951.
- Offsite Communicator (EP Room 115B -- *4970, DEMNET, *Radio, *875-1951.
- IAE Communicator (CBX Equipment Room 112) -- *4248.
- Data Coordinator (CBX Equipment Room 112) -- *4999.
- Dose Assessor (SCR Room 100D) -- *4405.
- Public Affairs (Rooms 118 and 141) -- *4400, *4419, *4233.
- NRC (NRC Office, Room 126) -- *875-1681.
- Other, use Jaguar Room as needed (Room 144) -- *4826.

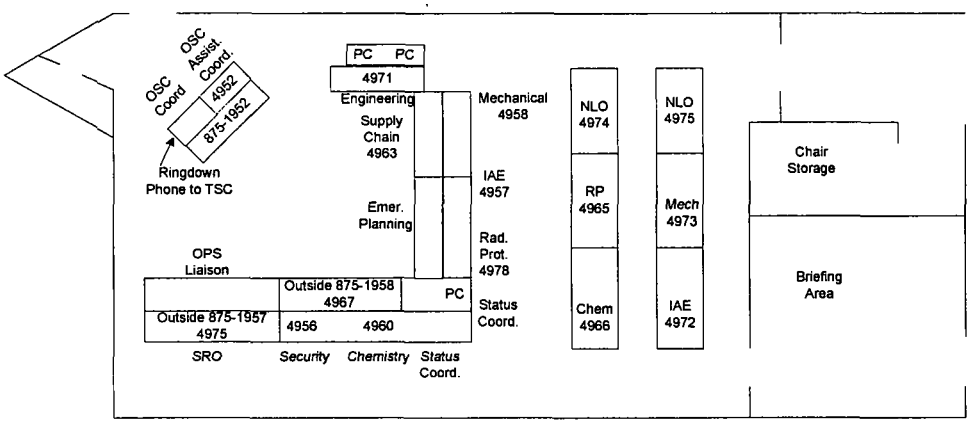
Office Equipment

- FAX (Mail Room, Room 116) -- *875-4506.
- FAX (EP Room 114) -- *875-4382.
- Copier (Mail Room, Room 116).
- Copier (SA Room 170).
- CBX (CBX Office in Admin. Building Lobby).

* Indicates existing phones. All others are to be plugged in when the Alternate TSC is activated.

FIGURE H-10

MCGUIRE NUCLEAR SITE
ALTERNATE OPERATIONS SUPPORT CENTER
(TRAINING ROOM TR155, ADMIN. BUILDING)



Office Equipment

- FAX, Mail Room, Room 116 -- *875-4506.
- FAX, EP, Room 114 -- *875-4382.
- Copier, Mail Room, Room 116.
- Copier, SA, Room 170.
- CBX, CBX Office in Lobby.

* Indicates existing phone. All others are to be plugged in when the Alternate OSC is activated.

§50.54(q) Screening Evaluation Form **Activity Description and References: MNS Emergency Plan Section H (Emergency Facilities and Equipment) Rev 14-5 December 2014**

BLOCK 1

Page H-16 Changed from "SSN-315" to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, includes information on how to operate DEMNET.

DEMNET was incorporated to remove the Selective Signaling System and on the use of the new communication network, for making emergency notifications to off-site agencies by initiating group calls to the government agencies using DEMNET "~~MSN~~ MNS Notify". KLM 10-28-14

Planning Standards 50.47(b)(5) and 50.47(b)(6), are impacted by the new DEMNET process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**	**Change Type:** **BLOCK 4**
☐ The change is editorial or typographical ☒ The change is not editorial or typographical	☐ The change does conform to an activity that has prior approval ☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

- ☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
- ☐ §50.47(b)(2) – Onsite Emergency Organization
- ☐ §50.47(b)(3) – Emergency Response Support and Resources
- ☐ **§50.47(b)(4) – Emergency Classification System***
- ☒ **§50.47(b)(5) – Notification Methods and Procedures***
- ☒ §50.47(b)(6) – Emergency Communications
- ☐ §50.47(b)(7) – Public Education and Information
- ☐ §50.47(b)(8) – Emergency Facility and Equipment
- ☐ **§50.47(b)(9) – Accident Assessment***
- ☐ **§50.47(b)(10) – Protective Response***
- ☐ §50.47(b)(11) – Radiological Exposure Control
- ☐ §50.47(b)(12) – Medical and Public Health Support
- ☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
- ☐ §50.47(b)(14) – Drills and Exercises
- ☐ §50.47(b)(15) – Emergency Responder Training
- ☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Screening Evaluation Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Randy Gibson	RGM	9/25/14
Reviewer Name:	**Reviewer Signature**	**Date:**
Marc Mulkey	Marc Mulkey	10/27/14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section H (Emergency Facilities and Equipment) Rev 14-5 December 2014

BLOCK 1

Page H-16 Changed from "SSN-315" to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

New Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, will also be issued. The new Fleet procedure includes information on how to operate DEMNET.

DEMNET changes were incorporated to remove the Selective Signaling System and add instructions on the use of the new communication network, DEMNET. Step details for using the old Selective Signaling system were deleted or replaced with instructions for using DEMNET. Step details for using DEMNET include the following: Initiating group calls to the government agencies with the DEMNET "~~MSN~~ MNS Notify" button, use of the Alternate DEMNET buttons, and notes containing supplemental information.

Additional information regarding this change:

The Selective Signaling emergency communications system has been the primary method of prompt communication to State and local Offsite Response Organizations (OROs) from the McGuire Nuclear Station (MNS) for many years. Within the confines of MNS, Selective Signaling operates as part of the normal plant communications system (i.e. internal extensions, commercial phones, etc.). Beyond the boundaries of MNS, Selective Signaling transmits over analog lines that are leased from local telephone providers. In the past, these lines have been subject to damage by natural and man-made causes or other failures such that all or part of communication ability of MNS to or from some or all of the OROs via Selective Signaling has been lost for various periods of time.

Since Selective Signaling is an unmonitored system, it is typically not known that problems exist until the system is used (i.e., during periodic testing, communication checks, drills, etc.). When problems are identified and reported, it is up to the local telephone provider to determine when the repair(s) can be made. In addition to the less than reliable service for the Selective Signaling system, Duke Energy has been notified by local telephone providers that due to the frequency of failures and the ever increasing difficulty in obtaining repair parts / materials, they will no longer be able to provide repair / maintenance support of the antiquated system beyond 2014.

As a solution for this, Duke Energy has selected Emergency Management Network (EMnet) as provided by the vendor, Communications Laboratories (Comlabs). EMnet is currently in use by a number of Federal, State, and local government agencies, and is being implemented by an increasing number of nuclear stations / utilities. EMnet will be referenced as DEMNET for the remainder of this evaluation. Comlabs provides hardware, software, training, installation and other services necessary for DEMNET to operate. DEMNET is being implemented across the Duke Energy Fleet as a replacement for Selective Signaling.

DEMNET allows the Control Room, Technical Support Center (TSC), Emergency Operations Center (EOF), and alternative response facilities to communicate with Offsite Response Organizations and/or with each other using VoIP (voice-over-internet protocol) as the primary method. In the event of internet related problems (i.e., slow data transfer rate, unavailability, etc.), the system automatically transfers to satellite communication as a backup. Like Selective Signaling, DEMNET allows internal and external point-to-point contact between individual stations as well as simultaneous conferencing with multiple stations. This ability is a valuable backup to existing telephone circuits. The point-to-point

capability also allows DEMNET to continue to provide Decision Line capability, which enables ORO decision makers to use the system to discuss public protective actions over dedicated / controlled access communication links.

Via the dedicated DEMNET computer, historical and real-time system status can be readily determined. DEMNET is also monitored by the vendor, Comlabs. This allows for a more proactive approach in identification and resolution of problems associated with the system should they occur. In the event of failure, the application of suitable compensatory measures (i.e., use of back up communications) can be made in a more efficient and effective manner.

No changes are made to the communications systems that currently serve as a backup to Selective Signaling or the associated implementation process(es) for employing them.

DEMNET equipment installed and operated at Duke Energy nuclear plants and support facilities is installed and maintained to meet cyber security requirements in accordance with 10 CFR 73.54 and other related guidance.

As part of the installation process, DEMNET has been extensively tested to ensure connectivity / operability before being placed in service. Duke Energy Emergency Response Organization and Emergency Preparedness, along with personnel from Offsite Response Organizations have received training on the new system as well.

As configured, the network that DEMNET resides within MNS causes the system to be powered from various sources based upon the physical location of the individual components within the network. In the event normal and/or backup power supplies become unavailable, and as a result, DEMNET and all other backup communications system become non-functional, MNS and the OROs have a number of battery powered portable satellite phones available that can be placed into service in an effort to maintain the capability of providing prompt communications between MNS and the OROs.

Upon implementation across the Duke Energy Fleet and its State and local Offsite Response Organizations, the product name "EMNet" is replaced with the new system name "Duke Emergency Management Network (DEMNET)". The name "Selective Signaling" will no longer be used, while the name "Decision Line" will continue to be used.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*
☐ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

- 10 CFR 50.47(b)(5) - Notification Methods and Procedures (Risk Significant Planning Standard) states: "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

  The applicable emergency planning function associated with 10 CFR 50.47(b)(5) states: "Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications."

- 10 CFR 50.47(b)(6) – Emergency Communications states: "Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The applicable emergency planning functions associated with 10 CFR 50.47(b)(6) state:

- Systems are established for prompt communication among principal emergency response organizations.
- Systems are established for prompt communication to emergency response personnel

Licensing Basis:

This evaluation included a search of McGuire Nuclear Station (MNS) licensing basis documents for references to the Selective Signaling system. The search concluded that a review of the Duke Energy McGuire Nuclear Station (MNS) Emergency Plan was warranted.

While the MNS Emergency Plan contains several references to Selective Signaling, there are no details within the Emergency Plan regarding usage of the system, other than to indicate that it is the primary system used for prompt communications to the offsite response organizations. DEMNET is replacing Selective Signaling as the primary system used for prompt communications to the offsite response organizations.

Other references within the MNS Emergency Plan include facility diagrams which indicate the location of Selective Signaling telephones. DEMNET equipment is replacing Selective Signaling in each location where Selective Signaling was present.

The MNS Emergency Plan also references periodic testing of Selective Signaling. DEMNET will be tested in a similar manner and frequency as was Selective Signaling.

Consequently, the replacement of the Selective Signaling system with DEMNET within the MNS Emergency Plan will constitute a name change only.

This review concludes that changes to this document relative to the replacement of Selective Signaling with DEMNET do not affect the licensing basis of the MNS Emergency Plan. The changes in this revision support replacement of the Selective Signaling telephone system, which is used for notifications to state/county agencies, with a new dedicated telephone system called the Duke Emergency Management Network (DEMNET). These changes support a Duke Energy fleet-wide initiative to upgrade the dedicated telephone system for notifying state/county agencies of a declared emergency as an overall enhancement to emergency preparedness. These changes meet or exceed all emergency preparedness requirements based on NRC regulations and requirements.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

10 CFR Part 50, Appendix E, Section IV.D.1 states the following:
Administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary, shall be described. This description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs.

10 CFR Part 50, Appendix E, Section IV.D.3 states the following, in part:
A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate ...

10 CFR Part 50, Appendix E, Section IV.E.8.d states the following, in part:
For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: ... the capability to perform offsite notifications; ....

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 2.7, states, in part:
The TSC voice communication equipment shall include:

- Hotline telephone ...
- Dedicated telephone ...
- Dial telephones ...

- Intercommunications systems ...
- Communications ... to State and local operations center prior to EOF activation.

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 4.6, states, in part:
The EOF shall have reliable voice communications facilities to the TSC, the control room, NRC, and State and local emergency operations centers. The normal communication path between the EOF and the control room will be through the TSC. The primary functions of the EOF voice communications facilities will be:

- EOF management ...
- Communications ...
- Communications ...
- Communications to coordinate offsite emergency response activities, and
- Communications ... .

NUREG-0654 (Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants), Section II.F, states, in part:

1. The communications plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local, and State response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:

   a. provision for 24-hour per day notification to and activation of the State/local emergency response network; and at a minimum, a telephone link and alternate, including 24-hour per day manning of communications links that initiate emergency response actions.

   b. provision for communications with contiguous State/local governments within the Emergency Planning Zones;

   c. provision for communications ...

   d. provision for communications ...

   e. provision for alerting or activating emergency personnel in each response organization; and provision for communication ...

The replacement of Selective Signaling and Decision Line (SS/DL) with DEMNET continues to comply with applicable regulations and commitments by providing a dedicated method of contacting State and local authorities in a timely manner during an emergency.

Compliance is maintained in the following manner:

1. DEMNET is a dedicated system for communication with OROs that is capable of establishing contact within 15 minutes of emergency declaration. This is consistent with the capability of the SS/DL system.

2. DEMNET stations are present in the Control Room, TSC, EOF, and alternative facilities which are capable of initiating or receiving point-to-point or conference calls with any ORO site similarly equipped. This is consistent with the capability of the SS/DL system.

3. Compatible DEMNET stations are installed in all ORO locations that were serviced by the SS/DL system.

4. The TSC has an DEMNET station to allow communication with State and local OROs prior to EOF activation. This capability existed with the existing SS/DL system.

5. DEMNET is a voice communications system with dedicated stations located in the Control Room, TSC, EOF, alternative facilities, and State/local emergency operations centers and is capable of coordinating

offsite response activities via point-to-point or conference calling. Communications with NRC is conducted using a separate system unrelated to DEMNET. This is consistent with the SS/DL system.

NOTE: In addition to voice communications, DEMNET is also capable of transmitting data. The voice communications feature of DEMNET is the replacement for SS/DL voice communications capability.

6. DEMNET has redundant features to maintain communication capability in the event of system failure or degradation. During normal operation, DEMNET employs voice-over-internet protocol (VoIP) technology
to establish contact between stations. Should internet problems (unavailability, slow transfer rate, etc.) occur, the system will automatically shift to satellite communication as a backup. This backup feature is an enhancement that SS/DL did not have. Failure of the SS/DL system required the use of the commercial telephone system to re-establish communications.

7. By locating an DEMNET station in the continuously staffed Control Room, the licensee provides 24-hour per day capability to establish links to initiate emergency response actions.

8. DEMNET stations are established at each contiguous State/local emergency response agency within the EPZ. This is consistent with the usage of the SS/DL system.

- 10 CFR 50.47(b)(5) states the following:

"Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

The function of this planning standard pertinent to this change is the establishment of procedures for State and local governmental agencies that are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

- 10 CFR 50.47(b)(6) states the following:

"Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The function of this planning standard pertinent to the change is that systems be established for prompt communications among principal response organizations.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:
The screening of this change has identified two (2) affected planning standard functions described above:

1. Procedures for notification of State and local government agencies are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

Additional procedures are currently in effect for notification of State and local agencies following a declared emergency. These procedures explicitly require that such notification occur within 15 minutes of emergency declaration.

Station procedures were originally intended to address notifications using the Selective

Signaling/Decision Line (SS/DL) system and have likewise been revised to address the change to DEMNET. The functionality and utility of the procedures remain unaffected by the proposed change. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

2. Systems are established for prompt communication to emergency response personnel.

   The SS/DL system suffered from obsolescence and eroding vendor support. The communications carriers currently providing service for the system informed the licensee that all support will terminate at the end of 2014. This prompted the change to DEMNET, a communications system widely used in the emergency response community.

   As described above, DEMNET possesses all of the capabilities of SS/DL with additional enhancements not found in the former system. Significant among these is the use of robust VoIP technology and automatic "failover" to satellite communications in the event of a failure or degradation of the primary internet flowpath. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

   The evaluation concludes that the change does not impact either applicable planning function negatively and therefore does not constitute a reduction in effectiveness.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Mark Mulkey	Reviewer Signature	Date: 10/27/14
Approver Name: **Kevin L. Murray**	Approver Signature	Date: 11-11-14

I. ACCIDENT ASSESSMENT

To assure the adequacy of methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition.

I.1 Emergency Action Level Procedures

Emergency Action Level procedures have been established in accordance with NUMARC/NESP-007 (Rev. 2) that was approved by the NRC in Revision 3 of Regulatory Guide 1.101, and subsequent guidance provided in NRC Bulletin 2005-02, the guidance endorsed in RIS 2006-12 and to support implementation of NEI 03-12. See Bases Document in Section D.

Emergency Response Procedure, RP/0/A/5700/000, Classification of Emergency, will identify the system parameter and effluent parameter values which can be used to determine the emergency condition.

I.2 Onsite Capability and Resources to Provide Initial Values and Continuing Assessment

I.2.a. Post Accident Sampling

The requirement to have reactor coolant and containment atmosphere post accident sample panels (PASS) has been deleted per NRC License Amendment 199/180 by letter dated September 17, 2001. As a result, Emergency Plan Implementing Procedures HP/1/B/1009/015, Unit 1 Nuclear Post-Accident Containment Air Sampling System Operating Procedure and HP/2/B/1009/015, Unit 2 Nuclear Post-Accident Containment Air Sampling System Operating Procedure have been deleted. These EPIPs were replaced by Radiation Protection group procedure HP/0/B/1009/032, Sampling Containment Atmosphere Under Accident Conditions. **HP/0/B/1009/032 is <u>not</u> an EPIP or a part of the EPLAN. It is listed in this paragraph for <u>reference purposes only</u>.** HP/0/B/1009/032 provides contingency methods for containment atmosphere sampling under accident conditions.

Also as a result of NRC License Amendment 199/180, OP/0/B/6200/090, PALSS Operation for Accident Sampling has been deleted from the EPLAN as an Emergency Plan Implementing Procedure. However, OP/0/B/6200/090 will be retained as a Chemistry group procedure to provide contingency methods for reactor coolant and containment sump sampling under accident conditions. **OP/0/B/6200/090 is <u>not</u> an EPIP or a part of the EPLAN. It is listed in this paragraph for <u>reference purposes only</u>.**

I.2.b. Radiation and Effluent Monitors

Radiological monitoring capabilities include process and effluent monitoring systems (FSAR 11.4); area monitoring system (FSAR 12.1.4); plus station portable monitoring instruments, laboratory counters and analyzers (FSAR 12.3.2.4), including emergency high-range instruments and air samplers.

In addition, there are two (2) high range containment monitors, two (2) high range unit vent monitors, four (4) steam line monitors per unit and four (4) N-16 steam line monitors per unit.

I.2.c In-plant Iodine Instrumentation

Radioiodine sampling cartridges are used for sampling containments and unit vents. Radiation Protection personnel are knowledgeable in the appropriate site procedures required and are trained in the equipment required to determine airborne iodine concentrations in the plant under all conditions. Procedures to determine airborne iodine concentrations will cover analyses to be done if counting room capabilities are not available.

I.3.a/ I.3.b Method For Determining Release Source Term

Procedures HP/0/B/1009/006, HP/0/B/1009/010 and AD-EP-ALL-0202 are used on shift, in the TSC and/or EOF for the calculation of potential off-site doses based on a Design Basis Accident, release of primary coolant, or release of GAP activity situation scaled to actual containment monitor readings. Provisions for use of actual source terms exist in the procedures.

The magnitude of the release is based on actual effluent monitoring readings, plant system parameters (containment pressure), area meteorology and the duration of the release.

I.4 Effluent Monitor Readings Vs Onsite/Offsite Exposure

The procedures referenced in I.3.a/I.3.b establish the relationship between effluent monitor readings and on-site/off-site exposures and contamination for various meteorological conditions.

I.5 Meteorological Information Availability

Meteorological information will be available to the Emergency Operations Facility, the Technical Support Center, the Control Room through use of the Station Operator Aid Computer (OAC) and by direct telephone communication. Meteorological information will be available to the NRC through the Emergency Response Data System (ERDS), Health Physics Network (HPN) or by direct telephone communications with the individual responsible for making off-site dose assessments either at the Technical Support Center or the Emergency Operations Facility.

Meteorological information will also be given to both the county Emergency Operations Centers and the State of North Carolina during initial and follow-up information via the message format in Figure E-1.

I.6 Release Rates/Projected Dose For Offscale Instrumentation

If instrumentation used for dose assessment is offscale or inoperable, dose rates within the Reactor Building will be determined using procedure HP/0/B/1009/002, Alternative Method

for Determining Dose Rate Within the Reactor Building, or HP/0/B/1009/006, Procedure for Quantifying High Level Radioactivity Release During Accident Conditions.

I.7/ I.8 Field Monitoring Within E.P.Z.

Field monitoring within the McGuire Emergency Planning Zone will be performed in accordance with HP/0/B/1009/023, Environmental Monitoring for Emergency Conditions.

Four off-site field monitoring teams are comprised from site personnel and are under the direction of the Field Monitoring Coordinator. On-site monitoring is performed by Radiation Protection personnel under the direction of the OSC Radiation Protection Supervisor. HP/0/B/1009/023 describes how to obtain the vehicles to be used, routes to be used, sampling and monitoring equipment to be used, locations of TLD's and directions for taking KI tablets.

An emergency radio system is available for the field monitoring teams to use to relay information to the TSC/EOF. The state will be able to monitor the results of the field monitoring teams and relay results to the counties.

I.9 Detect and Measure Radioiodine Concentration in the EPZ

Air sampling results will be obtained through the use of a Portable Single Channel Analyzer and appropriate gamma sensitive detector. The air sample will be taken with a Portable Air Sampler equipped with a CP-100 or an acceptable charcoal cartridge and particulate filter.

Interference from the presence of noble gas and background radiation shall not decrease the minimum detectable activity of 1E-7 μCi/cc (microcuries per cubic centimeter) under field conditions.

These samples taken by the offsite monitoring teams will be evaluated further by one of the available laboratory facilities described in Section C.3. A multi-channel analyzer will be used to perform this evaluation.

I.10 Relationship Between Contamination Levels and Integrated Dose/Dose Rates

Provisions for relating contamination levels, water, and air to dose rates for key isotopes is found in HP/0/B/1009/021.

I.11 Plume Tracking

The state of North Carolina has arrangements to locate and track an airborne plume of radioactive materials. Duke Power Company will have monitoring teams in the field, fixed TLD sites and the capability for airborne monitoring to assist in plume tracking.

§50.54(q) Screening Evaluation Form **Activity Description and References:** **BLOCK 1**

MNS Emergency Plan Section I (Accident Assessment) Rev 14-5 December 2014 Click here to enter text.

Page I-2 - Deleted any reference to HP/0/B/1009/029 and SH/0/B2005/001 and replaced with AD-EP-ALL-0202 (Emergency Response Offsite Dose Assessment).

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites.

Planning Standards 50.47(b)(8) and 50.47(b)(9), are impacted by the new URI process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical

☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval

☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☒ §50.47(b)(8) – Emergency Facility and Equipment
☒ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination:	**BLOCK 6**
☐ The activity does involve a site specific EP commitment Record the commitment or commitment reference: _____ ☒ The activity does not involve a site specific EP commitment	
Screening Evaluation Results:	**BLOCK 7**
☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation ☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation	

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Marc Mallory	Reviewer Signature	Date: 10/22/14

50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section I (Accident Assessment) Rev 14-5 December 2014

BLOCK 1

Page I-2 for I.3.b - Deleted procedures HP/0/B/1009/029 and SH/0/B/2005/001 and replaced with AD-EP-ALL-0202.

To support a Duke Energy fleetwide initiative, replacing instructions associated with the RADDOSE dose assessment tool with Unified RASCAL Interface (URI).

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites. As a result, specific site procedures for performing dose projections are superseded by AD-EP-ALL-0202.

Additional information supporting this change:

RADDOSE is the current application used for dose assessment and projection of radiological releases during an emergency. The proposed change will replace RADDOSE with the Unified RASCAL Interface (URI) as the standard fleet-wide dose assessment tool.

RADDOSE is designed to estimate dose rates and deposition rates at 15-minute time intervals. From these estimates, integrated doses (using EPA 400-R-92-001 (EPA-400)[14] dose factors and methodologies) and total deposition are calculated for the length of time covering the release of radioisotopes.
Doses are determined at radial grid and special receptor locations in the Plume Exposure Pathway Emergency Planning Zone while deposition is calculated to fifty miles surrounding the facility, based on radiological and meteorological data collected at the plant.

The RADDOSE model is designed to provide real-time (as the release is occurring) and projected site specific predictions of atmospheric transport and diffusion as required by NUREG-0654, Revision 1, Appendix. Atmospheric transport and diffusion are performed using a variable trajectory plume simulation model along with realtime meteorological data entered either directly from the PI server or manually. Likewise, the source term component of RADDOSE uses plant specific radiological data, for a number of accident types, entered via the PI server or manually. Using this information along with EPA-400 dose conversion factors, the model determines dose rates, doses, deposition rates and total deposition.

URI is a computer code intended for use at nuclear generating stations and other emergency response facilities in the event of an actual or potential release of airborne radioactivity to the environment at levels warranting declaration of an Emergency specified in the Radiological Emergency Plan. URI is a replacement for the user interface normally delivered with the computer code Radiological Assessment System for Consequence AnaLysis ("RASCAL") maintained and distributed by the by the Nuclear Regulatory Commission (NRC).

The URI program:

- Provides a user interface specifically designed for users for nuclear power station events.
- Allows input of all required dose assessment model parameters including meteorological data, plant effluent monitor data, and plant condition and status.
- Develops source terms based on user input.

- Creates RASCAL data files based on the specific user input
- Invokes the RASCAL met data processor, plume model processor, and puff model processors.
- Reads and interprets RASCAL results files and provide reports to the user of doses, affected areas, and other information relevant to emergency plan implementation.

The code has three modes: Rapid Assessment, Detailed Assessment, and Sum Assessment. Rapid Assessment enables on-shift staff to meet regulatory requirements for quick, simplified dose assessments in the initial phases of an event. Detailed Assessment enables the Emergency Response Organization staff to make more detailed dose assessments. Sum Assessment adds multiple concurrent assessment results.

Because certain aspects of the interface must be site or unit specific, particularly the release pathways, separate programs are used for each unit, or when possible, multi-unit site if the units are identical. The majority of the code forms and modules are common to all these separate programs, with the pathways and site specific setup parameters different for each site / unit.

The program utilizes two types of data:

- User inputs
- Constants stored in external encrypted xml format files unique to each site.

User inputs are values needed to run dose assessments that vary from assessment to assessment. These would consist of items such as meteorological data and effluent monitor readings.

Constants are values set internally by the system administrators. These would consist of items such as site boundary distances and monitor response factors that define the site and do not change for each assessment. A separate computer program called "Interface Maintenance" is used to control and generate these constants and maintain the SQL data table files that these constants are stored in. The URI computer programs cannot change constant values or their related encrypted xml files.

The dose assessment computer programs will only be run when a user needs to perform a dose assessment. The code does not generate any data that needs to be retained by the program after an assessment is completed, though reports can be printed or saved to individual files for later retrieval if required.

There are no interfaces with plant safety systems.

The URI programs are specifically designed to interface with versions 4.0 to 4.2 of the NRC computer program RASCAL. It is expected that future revisions will remain compatible but would need to be verified for each new RASCAL release. RASCAL is designed to produce emergency release dose assessments. RASCAL communicates between its own separate modules (.exe and .dll modules) using ASCII text data files. The URI programs interface with RASCAL by creating the same data files in the same format based on the information stored in the xml data tables and the user input. These RASCAL data files are modified or retrieved 'on-the-fly' for each assessment performed.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☒ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

10 CFR 50.47(b)(8) states: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained."

The emergency planning functions associated with 10 CFR 50.47(b)(8) state:

- Adequate facilities are maintained to support emergency response.

- Adequate equipment is maintained to support emergency response.

The applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E states (in part): Adequate provisions shall be made and described for emergency facilities and equipment, including:
2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.H.8 states:

Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.

10 CFR 50.47(b)(9) states: "Adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use."

The emergency planning function associated with 10 CFR 50.47(b)(9) states:

- Methods, systems and equipment for assessment of radioactive releases are in use.

The applicable supporting requirements which are described in 10 CFR 50, Appendix E state:

Section IV.B (in part):

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described,

Section IV.E (in part):

Adequate provisions shall be made and described for emergency facilities and equipment, including:

2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.I states (in part):

8. Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment and estimated deployment times.

9. Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} uCi/cc (microcuries per cubic centimeter) under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detected activity.

The applicable informing criteria described in NUREG-0696, Section 4.8 states (in part):

The EOF technical data system will receive, store, process and display information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data providing information...

The EOF data set shall include radiological, meteorological, and other environmental data needed to:

- Assess environmental conditions,
- Coordinate radiological monitoring activities, and
- Recommend implementation of offsite emergency plans.

Licensing Basis:

This evaluation included a search of MNS licensing basis documents for references to Dose Assessment, and specifically for references to RADDOSE-V. The search concluded that while the dose assessment function is

discussed, specific references to the dose assessment tool and how to perform dose assessments are not discussed. As a result, the MNS licensing basis is not impacted by the change to replace RADDOSE-V with URI as the dose assessment tool. The change is which supports replacement of RADDOSE V with URI and is strictly administrative and does not affect the licensing basis.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

The replacement of RADDOSE with URI will continue to comply with applicable regulations and commitments by providing a means of assessing offsite radiation dose during an emergency.

Compliance with the requirements identified above is maintained in the following manner:

Item 1

URI uses plant effluent monitor values and meteorological instrumentation input for the calculation of dose assessment results. These results are then used to determine the environmental impact of radioactive material releases and to direct the activities of field monitoring teams in plume tracking. Licensee emergency response personnel also use the assessment results to make protective action recommendations to state and local authorities. These features of URI are consistent with the current capabilities of RADDOSE.

RADDOSE employs an automatic data download from selected meteorological and radiation monitoring instrumentation to make dose projections. Typically, these downloads occur at 15-minute intervals. The user performing the assessment is responsible for validating the downloaded information against current plant conditions. While URI has no provision for automatic data downloading, it does allow the user to "drag and drop" meteorological and radiation parameters into the fields used by the application. This does not result in a significant delay since most of the time spent for data input in both RADDOSE and URI is for data validation. Field syntax restrictions reject out-of-range data to prevent erroneous information from being used in projection calculations. This feature, coupled with continual validation by the user, minimizes the risk of incorrect data entry.

Item 2

The portion of this requirement pertinent to the proposed change is that the licensee provide the method to perform rapid radiological assessments.

RADDOSE uses a Gaussian dispersion model and employs dose conversion factors taken from EPA 400, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*. URI uses a similar model with the same dose conversion factors. Empirical comparisons of both applications yield similar dose projection results when subjected to the same radiological and meteorological conditions. Calculation time of both applications is approximately the same. In addition, RASCAL (the underlying calculational base of URI) is sanctioned by the NRC and accepted as an industry standard application for dose projection.

Item 3

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of how offsite dose projections are made. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

Item 4

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of the equipment used for assessing the impact of the release of radioactive materials to the environment. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

The replacement of the Raddose-V dose assessment tool with URI involved rigorous testing and walkdowns to ensure the tool was ready for implementation. Duke Energy and the URI vendor performed a Validation and

Verification of the program to support implementation of the change. In addition, MNS ERO members qualified in dose projections received training on the changes and differences in dose projection methodology between RADDOSE-V and URI. This change to replace Raddose-V with URI does not change intent. This change supports the Duke Energy fleetwide initiative to replace the dose projection tool used for dose assessment and for protective action decision-making at all nuclear sites with an enhanced and improved methodology. The fleet procedure AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment" will now provide MNS dose assessment personnel with instructions for performing dose projections at the MNS site. The implementation of AD-EP-ALL-0202 ensures the correct software program for performing dose projections is used. This change continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

The change which supports the replacement of Raddose-V with URI is strictly administrative and continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:

The screening of the change from Raddose-V to URI identified two affected emergency planning functions associated with 10 CFR 50.47(b)(8) and 10 CFR 50.47(b)(9), as described above in the Impact and Licensing Basis Determination.

The change replaces RADDOSE with URI as the principal dose assessment tool. While the user interface for URI differs from that of RADDOSE, the assessment methodologies of both applications are essentially the same. Both employ the same dose conversion factors for determining source term dose. Both applications also use similar meteorological models of Gaussian plume dispersion.

URI provides a site specific overlay on the existing RASCAL meteorological, dispersion, and dose assessment models for all required input for emergency dose assessment as well as reports and plume graphics. Using the URI interface, the user does not interact with any part of the original RASCAL input or output screens.

Three of the primary purposes of URI are to make an interface that includes significant additional site specific processes (e.g. site specific effluent monitors), to simplify the input process for the user, and to use an industry common dose assessment model.

URI operates by providing a single input / result display form with non-serial input, and uses a 'pathway' release condition process rather than requiring the user to answer repetitive questions about the release. By selecting a 'pathway', options are set including default meteorological towers, release heights, applicable effluent monitors, etc. to limit the number of sequential questions the user must answer and to prevent selections that do not match. While all emergency effluent dose assessment systems require similar information (met data, isotopic mix, release magnitude), URI minimizes the effort required and significantly limits the opportunity for inappropriate selections. Options selections are defined for each specific pathway, which both prevent inappropriate selections and highlight to the user the available options for defining the engineered active and passive particulate and iodine removal processes that affect the mix appropriate for the selected pathway.

Numerous additional reports, data displays, etc. are provided for details when needed. Plume plots are provided, and a graphical display of areas exceeding the protective action guideline (PAG) limit is available. The PAG graphic can be based on either the standard 16 sectors and 3 distances or on geo-political emergency response areas.

One distinction between RADDOSE and URI deals with the identification of protective action recommendations (PARs). A feature of RADDOSE automatically flags the user when a dose projection determines that a PAR

threshold has been met. The user is then expected to refer to approved procedures to confirm the validity of this indication. Experience has shown that the automatic feature can be misleading under certain conditions and has led to incorrect PAR recommendations, particularly when the dose projection was performed by a less experienced user.

URI does not have this automatic flagging feature. PAR determination is made solely on approved procedural guidance without reliance on a potentially misleading indication.

Multiple options for source term basis are provided including monitored with single channel effluent monitors, monitored with multi-channel group monitors, or release point samples, and numerous unmonitored options including containment high radiation monitors, containment leakrate without monitors, RCS leakrate, or field team back calculation.

Three assessment methods are provided; a "Detailed" option for more experienced users, a "Rapid" option that makes more fundamental assumptions that is intended for immediate on-shift response, and a "Summation" option that allows for adding multiple concurrent releases. While the "Detailed" and "Rapid" options are consistent with current RASCAL assessment modes, the "Summation" option is an enhancement resulting from Fukushima experience.

The URI application, using site-specific inputs, has been evaluated against the software quality assurance criteria of NSD-800. Comparison of test cases for RADDOSE and URI show consistently satisfactory results. The two applications showed no significant difference in the timeliness or accuracy of dose assessment information.

In summary, URI is characterized by:

- a user-friendly input interface,
- graphical overlays displaying projected plume paths and dose values,
- the ability to perform dose projections using multiple simultaneous releases, and
- wide acceptance by both the industry and the NRC as an effective dose assessment application.

The change does not result in a reduction in effectiveness of facilities, response organizations, or response equipment. This change is strictly administrative and does not change intent. This change supports the replacement of the RADDOSE dose assessment tool with Unified RASCAL Interface (URI). This change does not affect the timeliness, accuracy or capability to determine or process dose projections and supports a fleetwide initiative to align dose assessment tools at all Duke Energy nuclear plant sites.

This change does not affect the emergency planning functions associated with 10 CFR 50.47(b)(8), because this change continues to ensure that adequate facilities and equipment are maintained at MNS to support emergency response, including equipment used for performing dose projections. This change does not affect the applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E, because this change continues to ensure that adequate provisions shall be made and described for emergency facilities and equipment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.H.8.

This change does not affect the emergency planning function associated with 10 CFR 50.47(b)(9), because the change continues to ensure that methods, systems, and equipment for assessment of radioactive releases are in use at MNS. This change does not affect the applicable supporting requirement described in 10 CFR 50, Appendix E.IV.B and E, because this change continues to ensure that equipment is available for determining magnitude and assessment of releases to the environment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.I (8-9) and NUREG-0696, Section 4.8.

As stated above, this change does not reduce the effectiveness of the MNS Emergency Plan. Instead, the change described in this revision continues to provide additional assurance that the ERO has the ability and capability to:

- respond to an emergency;
- perform functions in a timely manner;

- effectively identify and take measures to ensure protection of the public health and safety; and
- effectively use response equipment and emergency response procedures.

This change enhances ERO readiness to support a classified emergency, resulting in an improved capability to ensure health and safety of plant personnel and the general public. This change continues to meet NRC requirements, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

This change is an overall improvement to the MNS Emergency Preparedness Program.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: MARC Mulkey	Reviewer Signature	Date: 10/22/14
Approver Name: **Kevin L. Murray**	Approver Signature	Date: 11-11-14

J. PROTECTIVE RESPONSE

To assure that a range of protective actions is available for the plume exposure pathway for emergency workers and the public. Guidelines for protective actions during an emergency, consistent with Federal guidance, are developed and in place and protective actions for the ingestion exposure pathway appropriate to the locale have been developed.

To protect onsite personnel during hostile action and ensure the continued ability to safely shutdown the reactor and perform the functions of the emergency plan a range of protective actions are in place.

J.1. Onsite Alerting and Notification

The means and time required to warn, alert and/or notify employees not having emergency assignments (non-essential), visitors, contractor and construction personnel and other individuals who may be on or passing through the owner-controlled area are described in RP/0/A/5700/011, Conducting a Site Assembly, Site Evacuation or Containment Evacuation.

Methods to notify and alert onsite personnel (essential and non-essential) during hostile action activities are describe in AP/0/A/5500/047, Security Events and RP/0/A/5700/011, Conducting A Site Assembly, Site Evacuation or Containment Evacuation.

J.2 Evacuation Routes and Transportation

The Operations Shift Manager/Emergency Coordinator or designee uses site and local area maps, information available from meteorological tower instrument readouts and current radiological data for determining the evacuation route. Evacuation routes for onsite individuals to suitable offsite locations, including alternatives for weather or radiological conditions is provided in RP/0/A/5700/011, Conducting a Site Assembly, Site Evacuation or Containment Evacuation.

J.3 Personnel Monitoring

Radiation Protection emergency personnel survey teams equipped with portable monitoring instruments will monitor employees, visitors, contract workers and vehicles for contamination at the Relocation Sites. Monitoring will be performed in accordance with Radiation Protection procedure HP/0/B/1009/024, Personnel Monitoring for Emergency Conditions.

J.4 Site Evacuation Procedures - Decontamination/Non-Essential Personnel Criteria

Non-essential personnel may be evacuated from the plant site in the event of a Site Area Emergency and will be evacuated in the event of a General Emergency. Provisions are made for the decontamination of vehicles and personnel at an off-site location if the situation should warrant.

All members of the general public who are on-site must be evacuated if there is a possibility they may be exposed to dose rates in excess of any of the following:

External Radiation Level = 2 mrems/hr
Airborne Radioactivity = 1 times DAC for an unrestricted area

During hostile threat conditions that do not require Site Sheltering, Site Relocation of non-essential personnel to locations outside of the protected area are performed in accordance with AP/0/A/5500/047, Security Events and RP/0/A/5700/011, Conducting A Site Assembly, Site Evacuation or Containment Evacuation.

J.5 Personnel Accountability

Within thirty minutes of a Site Assembly, all persons within the Protected Area at the McGuire Nuclear Site can be accounted for and any person(s) determined to be missing, will be identified by name. RP/0/A/5700/11, Conducting a Site Assembly, Site Evacuation or Containment Evacuation, provides for the accounting of personnel (on site) continuously thereafter.

When hostile threat conditions permit, personnel accountability is performed in accordance with RP/0/A/5700/011, Conducting A Site Assembly, Site Evacuation or Containment Evacuation.

J.6 Protective Equipment - Breathing Apparatus, Protective Clothes, KI

Protective equipment and supplies will be distributed to respiratory qualified personnel remaining on site or arriving on site during the emergency to minimize the effects of radiological exposures or contamination. Protective measures will be utilized as follows:

Individual Respiratory Protection - Respiratory protective equipment will be used when airborne radioactivity levels exceed the appropriate limits specified in 10CFR20, Appendix B.

Self-contained breathing apparatus will also be used in areas that are deficient in oxygen or when fighting fires. Respiratory protective equipment will be issued by Radiation Protection or Safety and Health Services. Self-contained breathing apparatus are available with other fire fighting equipment for use by the site fire brigade.

Individual Thyroid Protection - All efforts should be made to utilize respiratory protective equipment to minimize ingestion and/or inhalation of radionuclides and to maintain internal

exposure below the limits specified in 10CFR20, Appendix B. However, if an unplanned incident involves the accidental or potential ingestion or inhalation of radioactive iodine, Potassium Iodide Tablets (KI) are available to distribution by SH/0/B/2005/003, Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release.

Use of Protective Clothing - Protective clothing will be issued when contamination levels exceed 1000 dpm/100 cm^2 beta-gamma and 20 dpm/100 cm^2 alpha of smearable contamination. Protective clothing items are located in the Change Rooms inside the Radiation Control Area, available for emergency use. Special fire-fighting protective clothing and equipment is available in designated site supply storage areas for use by fire brigade personnel.

J.7 Protective Actions Recommendations

The Emergency Coordinator (Operations Shift Manager or Station Manager) or the EOF Director shall be responsible for contacting the state and/or local governments to give prompt notification for implementing protective measures within the plume exposure pathway, and beyond it if necessary.

Protective Action Guides are adopted from EPA 400-R-92-001 and in the State Plan guidance on the use of KI and are shown in Figure J-1. A flowchart to aid the Emergency Coordinator/EOF Director in making Protective Action Recommendations is also shown in Figure J-1. {PIP-G-03-606}

As described in section B.4, the Emergency Coordinator and the EOF Director are responsible for making protective action recommendations. Prior to activation of the EOF, the Emergency Coordinator will be responsible for making these recommendations. After activation of the EOF, the EOF Director assumes this responsibility. Protective action recommendations will be provided to the off-site authorities (states and counties) who are responsible for implementing public protective actions. The pre-established warning message format (Figure E-1) will be used in transmitting the recommendations.

The mechanism for making dose projections upon EOF activation is as follows:

The Radiological Assessment Manager is responsible for making dose projections on a periodic basis. Calculations are made using a computer based dose projection model to calculate projected dose to the population-at-risk for either potential or actual release conditions. For conditions in which a release has not occurred but fuel damage has taken place and radiation levels in the containment building atmosphere are significant, a scoping analysis will be performed to determine what recommendations would be made if containment integrity were lost at that time. The analysis will be based upon a design leak rate and upon a projected penetration failure indicated by a hole size of certain diameter. This analysis will include the use of actual containment pressure, realistic meteorology, and actual source term. A Total Effective Dose Equivalent and Committed Dose Equivalent thyroid dose will be calculated at various distances from the plant (site boundary, 2 miles, 5 miles, 10 miles and beyond if needed). These dose projections are compared to the Protective Action Guides in Figure J-1, which are derived from the "Manual of Protective Action Guides and Protective Actions for

Nuclear Incidents" (EPA-400-R-92-001) and in the State Plan guidance on use of KI. Based on these comparisons, protective action recommendations are developed by the Radiological Assessment Manager. The Radiological Assessment Manager informs the EOF Director of the situation and recommendations for protective actions. {PIP-G-03-606}

If dose projections show that PAGs have been exceeded at 10 miles, the dose assessment code and in-field measurements, when available, shall be used to calculate doses at various distances down wind to determine how far from the site PAG levels are exceeded. The Radiological Assessment Manager shall forward the results to the EOF Director who will communicate this information to the offsite authorities.

J.8 Evacuation Time Estimates

An Analysis of Evacuation Time Estimates is available at the site and a summary of the Time Estimates is included in Figure J-3 and Appendix 4.

Under normal weather and for the critical time period (weekday during school hours), the maximum evacuation time for the McGuire EPZ is 4 hours 35 minutes. The critical component in the evacuation is the permanent resident population, all other segments of the population can be evacuated in less than the maximum time.

Under adverse weather conditions (winter storm), the evacuation time for the McGuire EPZ is 5 hours 40 minutes. This evacuation time assumes evacuation of the entire EPZ. Figure J-3 provides more detailed information including evacuation times for individual zones. Appendix 4 discusses the ETE used by the site, state and local planners.

A description of the methods and assumptions used in developing the analysis of evacuation time estimates is included in the current Evacuation Time Estimate study for McGuire Nuclear Site. (MNS-ETE-12132012, Rev. 000; MNS EVACUATION TIME ESTIMATES (ETE) DATED December 2012). The Evacuation Time Estimates will be considered in evaluating protective action recommendations from the Technical Support Center or the Emergency Operations Facility. A copy of the most recent study is available in the MNS Master File under MNS-ETE-12132012.000 or EP Office area.

An updated ETE analysis will be submitted to the NRC under §50.4 no later than 365 days after MNS determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

The criteria for determination that an updated ETE analysis have been met:

a) The availability of the most recent decennial census data from the U.S. Census Bureau:

   OR

b) If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the currently NRC approved or updated ETE.

During the years between decennial period censuses MNS will estimate EPZ permanent resident population changes once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. MNS will maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.

MNS ETE analysis, using the 2010 decennial census data from the U.S. Census Bureau, was submitted to the NRC via §50.4 on December 13, 2012.

J.9 Implementing Protective Measures

If protective actions for any off-site location are deemed necessary, the emergency management agency of the affected County, in conjunction with the appropriate State agency (NC-Department of Public Safety) has the legal authority and responsibility for initiating protective measures for the general public in the plume exposure pathway EPZ including evacuation of these areas. Use of sheltering as an alternative to evacuation for impediments to evacuation and special populations is a decision that will be made by the offsite officials. Sheltering in lieu of evacuation should also be considered during a short term release. A short term release is any release that can be accurately projected to be less than the affected protective action zone's evacuation time. An example would be a "puff release". In addition, sheltering may be appropriate (when available) for areas not designated for immediate evacuation because: 1) it positions the public to receive additional instructions; and 2) it may provide protection equal to or greater than evacuation. {PIP G-04-337} Public notification of the emergency, the resources used to determine if an evacuation is necessary, the evacuation routes, and the methods used for evacuating persons in the plume exposure pathway EPZ are outlined in the appropriate County and State emergency plans.

See County and State Plans for more detailed information.

For hostile action events, a range of protective actions for onsite workers including site relocation of essential personnel from potential target buildings, timely evacuation of non-essential site personnel, dispersal of critical personnel to safe locations, on site sheltering of

personnel and accountability of personnel after the attack are provided in emergency plan implementing procedures AP/0/A/5500/047, Security Events and RP/0/A/5700/011, Conducting A Site Assembly, Site Evacuation or Containment Evacuation.

J.10 Implementation of Protective Measures for Plume Exposure Pathway

J.10.a EPZ Maps

Figures i-1 and 2 describe the EPZ's, government jurisdictions and evacuation zones for McGuire Nuclear Site. Evacuation routes are displayed in Figure J-5.

J.10.b EPZ - Population Distribution Map

Figure J-6 describes the population distribution by Emergency Planning subzone. The FSAR describes the population distribution by sector.

J.10.c EPZ - Population Alerting and Notification

As described in Appendix 3 of this plan, a system exists for alerting and notifying the population (resident and transient) within the EPZ areas. This system is activated by the county and state organization and includes the use of large fixed-site sirens and the Emergency Alert System (EAS). A back-up means of alerting and notification is described in the State and County Emergency Plans.

J.10.d EPZ - Protecting Immobile Persons

See County and State Plans.

J.10.e Use of Radioprotective Drugs For Persons in EPZ

See County and State Plans.

J.10.f Conditions For Use of Radioprotective Drugs

See County and State Plans.

J.10.g State/County Relocation Plans

See County and State Plans.

J.10.h Reception Center Locations

See County and State Plans.

J.10.i Evacuation Route - Traffic Capacities

See County and State Plans.

J.10.j Evacuated Area Access Control

See County and State Plans.

J.10.k Planning For Contingencies in Evacuation

See County and State Plans.

J.10.l State/County Evacuation Time Estimates

The estimates shown in Appendix 4 are references in the County and State Plans.

J.10.m Bases For Protective Action Recommendations

Figure J-1 describes the considerations used by Duke management in developing protective action recommendations.

J.11 Ingestion Pathway Planning

See County and State Plans.

J.12 Reception Center - Registering & Monitoring

See County and State Plans

Figure J-1
1 of 3
Guidance for Offsite Protective Actions

INITIAL PAR Determination

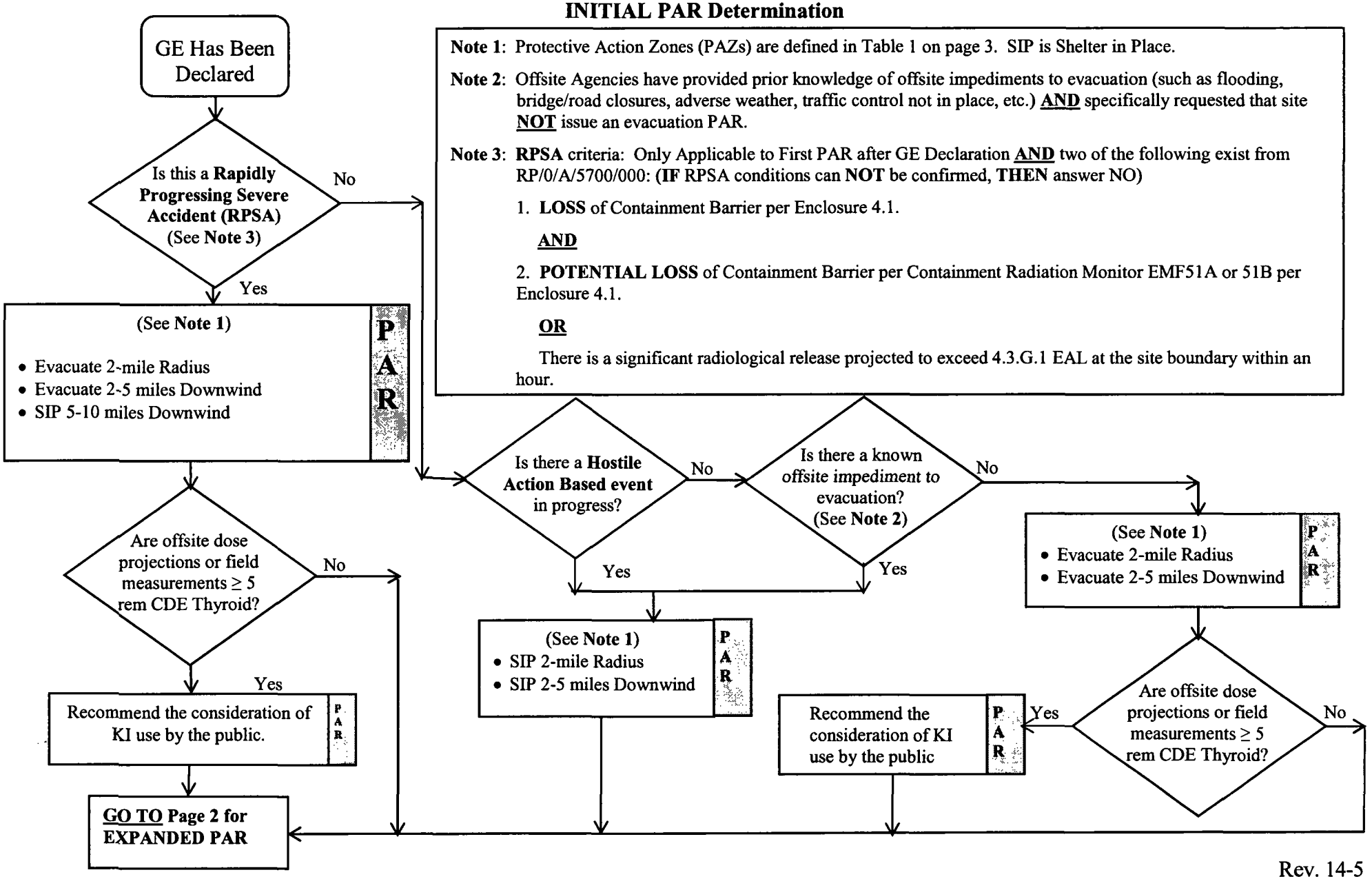


Figure J-1
2 of 3
EXPANDED PAR Determination

Note 1: Protective Action Zones (PAZs) are defined in Table 1 on page 3. SIP is Shelter in Place.

(IF a PAZ has been accurately selected for evacuation, it shall remain selected.)

Note 2: Offsite Agencies have provided prior knowledge of offsite impediments to evacuation (such as flooding, bridge/road closures, adverse weather, traffic control not in place, etc.) **AND** specifically requested that site **NOT** issue an evacuation PAR.

Note 3: A short-term release is one that can be accurately projected to be < three hours and controlled by the licensee. This consideration would typically apply to controlled venting of containment.

Note 4: Plant conditions exist which would require the classification of a General Emergency per the EALs. This does NOT include consideration of offsite dose-based EALs.

From INITIAL PAR

Continuous Assessment

Evaluate PAR based on changes in any of the following:

- Increase in dose assessment projected values.
- Increase in field team measured values.
- Shift in 15-minute average wind direction resulting in additional sectors being affected. (Table 3 on page 3)
- Offsite Agencies provides information that offsite impediments no longer exist.
- Hostile action based event has been terminated.
- **IF** RPSA, when safer to do so consider evacuation of SIP PAZs based upon radiological assessment and discussions with Offsite Agencies.

Is there a **Hostile Action Based event** in progress?

No

Is there a known offsite impediment to evacuation? (See **Note 2**)

No

Is there a short-term release in progress? (See **Note 3**)

No

GE Conditions? (See **Note 4**)

No

Offsite Projected Dose projections or field measurements exceed PAGs? Table 2

No

Yes

Yes

Yes

Yes

Yes

(See **Note 1**)
- SIP 2-mile Radius
- SIP 2-5 miles Downwind
- SIP additional PAZ(s) that exceed PAGs

PAR

(See **Note 1**)
- Evacuate 2-mile Radius
- Evacuate 2-5 miles Downwind

PAR

Evacuate PAZ(s) that exceed PAGs. If projected dose exceeds 5-Rem Thyroid CDE then recommend the consideration of KI use by the public.

PAR

FIGURE J-1
3 OF 3
GUIDANCE FOR OFFSITE PROTECTIVE ACTIONS

Table 1			
Protective Action Zones			
Wind Direction	2 Mile Radius	2-5 Miles Downwind	5-10 Miles Downwind
0.1 - 22.5	B,C,L,M	D,O,R	E,F,S
22.6 – 45.0	B,C,L,M	D,O,R	E,Q,S
45.1 – 67.5	B,C,L,M	D,N,O,R	E,P,Q,S
67.6 – 90.0	B,C,L,M	D,N,O,R	P,Q,S
90.1 – 112.5	B,C,L,M	N,O,R	K,P,Q,S
112.6 – 135.0	B,C,L,M	A,N,O,R	I,K,P,Q,S
135.1 – 157.5	B,C,L,M	A,N,O	I,K,P,Q
157.6 – 180.0	B,C,L,M	A,N	H,I,J,K,P
180.1 – 202.5	B,C,L,M	A,N	G,H,I,J,K,P
202.6 – 225.0	B,C,L,M	A,D,N	G,H,I,J,K,P
225.1 – 247.5	B,C,L,M	A,D	F,G,H,I,J
247.6 – 270.0	B,C,L,M	A,D	F,G,H,I,J
270.1 – 292.5	B,C,L,M	A,D	E,F,G,H,J
292.6 – 315.0	B,C,L,M	A,D,R	E,F,G
315.1 – 337.5	B,C,L,M	D,R	E,F,G,S
337.6 – 360.0	B,C,L,M	D,R,O	E,F,S

Table 2	
PROTECTIVE ACTION GUIDES (PAGs) (Projected Dose or Field Measurements)	
Total Effective Dose Equivalent (TEDE)	Committed Dose Equivalent (CDE) Thyroid
≥ 1 Rem	≥ 5 Rem

Table 3	
WIND SPEED/DIRECTION	
ENF Radiation Protection Manager	Line 9
McGuire SDS	Group Display **ERORD5**
DPC Meteorological Lab	704-382-0139 704-373-7896
National Weather Service Greer, S.C	864-879-1085 800-268-7785

Figure J-2
Description of Evacuation Regions

Region	Description	Degrees From North:	Sub-Zone																	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R01	2-Mile Ring	N/A		X	X									X	X						
R02	5-Mile Ring	N/A	X	X	X	X								X	X	X	X			X	
R03	Full EPZ	N/A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
R04	Catawba County	N/A											X								
R05	Gaston County	N/A																		X	X
R06	Iredell County	N/A	X								X	X									
R07	Lincoln County	N/A												X	X	X	X	X	X		
R08	Mecklenburg County	N/A	X	X	X	X	X	X	X	X											
Evacuate 2-Mile Radius and Downwind to 5 Miles																					
Region	Wind Direction From:	Degrees From North:	Sub-Zone																	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R09	N, NNE	0.1 - 45.0		X	X	X								X	X					X	
R10	NE, ENE	45.1 - 90.0		X	X									X	X		X			X	
R11	E,ESE, SE	90.1 - 157.6		X	X									X	X	X	X				
R12	SSE	157.5 - 180.0		X	X									X	X	X					
R13	S	180.1 - 202.5	X	X	X									X	X	X					
R14	SSW, SW	202.6 - 247.5	X	X	X									X	X						
R15	WSW, W	247.6 - 292.5	X	X	X	X								X	X						
R16	WNW, NW, NNW	292.6 - 360.0		X	X	X								X	X						
Evacuate 5-Mile Radius and Downwind to the EPZ Boundary																					
Region	Wind Direction From:	Degrees From North:	Sub-Zone																	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R17	N	0.1 - 22.5	X	X	X	X	X	X						X	X	X	X			X	X
R18	NNE	22.6 - 45.0	X	X	X	X	X							X	X	X	X			X	X
R19	NE	45.1 - 67.5	X	X	X	X	X							X	X	X	X		X	X	X
R20	ENE	67.6 - 90.0	X	X	X	X								X	X	X	X		X	X	X
R21	E	90.1 - 112.5	X	X	X	X								X	X	X	X	X	X	X	X
R22	ESE	112.6 -135.0	X	X	X	X								X	X	X	X	X	X	X	
R23	SE	135.1 - 157.6	X	X	X	X							X	X	X	X	X	X	X	X	
R24	SSE	157.5 - 180.0	X	X	X	X					X		X	X	X	X	X	X		X	
R25	S	180.1 - 202.5	X	X	X	X					X	X	X	X	X	X	X	X		X	
R26	SSW	202.6 - 225.0	X	X	X	X				X	X	X	X	X	X	X	X	X		X	
R27	SW	225.1 - 247.5	X	X	X	X			X	X	X	X		X	X	X	X			X	
R28	WSW	247.6 - 270.0	X	X	X	X		X	X	X		X		X	X	X	X			X	
R29	W	270.1 - 292.5	X	X	X	X		X	X	X				X	X	X	X			X	

Figure J-2

Region	Description	Degrees From North:	Sub-Zone																	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R30	WNW	292.6 - 315.5	X	X	X	X		X	X					X	X	X	X			X	
R31	NW	315.1 - 337.5	X	X	X	X	X	X	X					X	X	X	X			X	
R32	NNW	337.6 - 360.0	X	X	X	X	X	X						X	X	X	X			X	
Staged Evacuation - 2-Mile Radius Evacuates, then Evacuate Downwind to 5 Miles																					
Region	Wind Direction From:	Degrees From North:	Sub-Zone																	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R33	N, NNE	0.1 - 45.0		X	X	X								X	X					X	
R34	NE, ENE	45.1 - 90.0		X	X									X	X		X			X	
R35	E,ESE, SE	90.1 - 157.6		X	X									X	X	X	X				
R36	SSE	157.5 - 180.0		X	X									X	X	X					
R37	S	180.1 - 202.5	X	X	X									X	X	X					
R38	SSW, SW	202.6 - 247.5	X	X	X									X	X						
R39	WSW, W	247.6 - 292.5	X	X	X	X								X	X						
R40	WNW, NW, NNW	292.6 - 360.0		X	X	X								X	X						
R41	5-Mile Ring	N/A	X	X	X	X								X	X	X	X			X	
Sub-Zone(s) Shelter-in-Place until 90% ETE for R01 then Evacuate			Sub-Zone(s) Shelter-in-Place										Sub-Zone(s) Evacuate								

Figure J-3

MNS ETE Based on 2010 Census

Time to Clear the Indicated Area of 90 Percent of the Affected Population														
	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, EPZ and each County														
R01 (B,C,L,M)	2:35	2:50	1:50	1:50	1:50	2:45	2:55	3:10	1:50	1:50	1:55	1:50	1:50	2:40
R02 (A,B,C,D,L,M,N,O,R)	2:50	3:10	2:25	2:45	2:20	2:45	3:10	3:35	2:25	2:40	3:00	2:20	2:25	3:30
R03 (All Sub-Zones)	4:35	5:00	3:30	3:55	3:10	4:35	5:00	5:40	3:30	3:50	4:10	3:10	3:40	4:50
R04 (K)	2:25	2:25	2:00	2:00	2:00	2:25	2:25	2:25	2:00	2:00	2:00	2:00	2:00	2:25
R05 (R,S)	2:20	2:30	2:10	2:15	2:10	2:20	2:30	2:35	2:05	2:15	2:25	2:05	2:10	2:20
R06 (A,I,J)	2:40	2:50	2:25	2:35	2:20	2:40	2:55	3:15	2:25	2:35	2:55	2:20	2:25	3:25
R07 (L,M,N,O,P,Q)	3:30	3:40	3:05	3:20	2:50	3:20	3:30	3:55	2:50	3:05	3:25	2:40	3:05	3:30
R08 (A,B,C,D,E,F,G,H)	4:35	5:00	3:30	3:55	3:10	4:40	5:05	5:45	3:30	3:50	4:10	3:10	3:35	4:50
2-Mile Region and Keyhole to 5 Miles														
R09 (B,C,D,L,M,R)	2:35	2:50	2:20	2:35	2:30	2:35	2:50	3:10	2:20	2:30	2:55	2:30	2:25	3:35
R10 (B,C,L,M,O)	2:30	2:40	1:55	1:55	1:55	2:35	2:45	2:55	1:55	1:55	2:00	1:55	1:55	2:30
R11 (B,C,L,M,N,O)	2:30	2:35	1:55	1:55	1:55	2:30	2:35	2:50	1:55	1:55	2:00	1:55	1:55	2:30
R12 (B,C,L,M,N)	2:30	2:40	1:55	1:55	1:55	2:35	2:40	2:55	1:55	1:55	1:55	1:55	1:55	2:30
R13 (A,B,C,L,M,N)	2:20	2:40	2:10	2:20	2:00	2:20	2:40	3:00	2:10	2:20	2:40	2:00	2:10	3:45
R14 (A,B,C,L,M)	2:25	2:40	2:10	2:20	2:00	2:25	2:45	3:00	2:10	2:20	2:35	2:00	2:10	3:40

Figure J-3

MNS ETE Based on 2010 Census

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
2-Mile Region, and Keyhole to 5 Miles														
R15 (A,B,C,D,L,M)	2:50	3:15	2:30	2:45	2:25	2:50	3:10	3:35	2:25	2:40	3:05	2:20	2:30	3:35
R16 (B,C,D,L,M)	2:35	2:50	2:25	2:35	2:30	2:35	2:50	3:10	2:20	2:30	2:55	2:30	2:25	3:40
5-Mile Region and Keyhole to EPZ Boundary														
R17 (A,B,C,D,E,F,L,M,N, O,R,S)	4:10	4:40	3:15	3:35	3:00	4:20	4:40	5:15	3:10	3:30	3:50	2:55	3:10	4:25
R18 (A,B,C,D,E,L,M,N, O,R,S)	2:45	3:05	2:30	2:45	2:30	2:50	3:05	3:25	2:30	2:40	3:00	2:25	2:30	3:15
R19 (A,B,C,D,E,L,M,N, O,Q,R,S)	2:55	3:15	2:35	2:50	2:35	2:55	3:15	3:35	2:35	2:45	3:05	2:35	2:35	3:20
R20 (A,B,C,D,L,M,N, O,Q,R,S)	2:45	3:10	2:25	2:40	2:20	2:45	3:00	3:30	2:20	2:35	2:55	2:20	2:25	3:25
R21 (A,B,C,D,L,M,N, O,P,Q,R,S)	3:00	3:15	2:35	2:55	2:30	2:55	3:15	3:40	2:30	2:45	3:10	2:30	2:35	3:30
R22 (A,B,C,D,L,M,N, O,P,Q,R,S)	3:00	3:20	2:35	2:55	2:35	3:00	3:15	3:40	2:30	2:45	3:10	2:30	2:40	3:30
R23 (A,B,C,D,K,L,M,N, O,P,Q,R)	3:05	3:20	2:40	2:55	2:35	3:00	3:15	3:45	2:30	2:45	3:10	2:30	2:40	3:35
R24 (A,B,C,D,I,K,L,M,N, O,P,R)	3:05	3:25	2:45	3:00	2:45	3:05	3:20	3:45	2:35	2:50	3:15	2:40	2:45	3:30

Figure J-3

MNS ETE Based on 2010 Census

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
5-Mile Region and Keyhole to EPZ Boundary														
R25 (A,B,C,D,I,J,K,L,M,N,O,P,R)	3:00	3:20	2:45	3:00	2:40	3:05	3:20	3:45	2:40	2:55	3:15	2:35	2:45	3:30
R26 (A,B,C,D,H,I,J,K,L,M,N,O,P,R)	3:15	3:35	2:50	3:05	2:40	3:15	3:30	4:00	2:45	3:00	3:25	2:35	2:50	3:45
R27 (A,B,C,D,G,H,I,J,L,M,N,O,R)	3:45	4:05	3:10	3:30	2:55	3:40	4:05	4:35	3:10	3:25	3:50	2:50	3:15	4:35
R28 (A,B,C,D,F,G,H,J,L,M,N,O,R)	4:30	5:00	3:30	3:50	3:05	4:35	5:05	5:35	3:25	3:45	4:10	3:00	3:35	4:50
R29 (A,B,C,D,F,G,H,L,M,N,O,R)	4:30	4:55	3:25	3:45	3:00	4:30	4:55	5:35	3:20	3:35	4:05	3:00	3:25	4:40
R30 (A,B,C,D,F,G,L,M,N,O,R)	4:25	4:45	3:15	3:40	3:00	4:25	4:50	5:20	3:15	3:35	4:00	3:00	3:25	4:35
R31 (A,B,C,D,E,F,G,L,M,N,O,R)	4:35	4:55	3:35	3:45	3:05	4:30	5:05	5:30	3:25	3:45	4:05	3:05	3:35	4:40
R32 (A,B,C,D,E,F,L,M,N,O,R)	4:10	4:35	3:10	3:30	2:55	4:20	4:40	5:10	3:15	3:30	3:50	2:55	3:15	4:20

Figure J-3

	Summer				Summer	Winter			Winter			Winter	Winter	Winter
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
Staged Evacuation - 2 Mile Region and Keyhole to 5 miles														
R33 (B,C,D,L,M,R)	3:10	3:20	3:10	3:20	3:30	3:10	3:20	3:30	3:15	3:20	3:30	3:30	3:15	4:00
R34 (B,C,L,M,O)	2:30	2:40	2:25	2:25	2:25	2:35	2:45	2:55	2:25	2:25	2:25	2:25	2:25	2:30
R35 (B,C,L,M,N,O)	2:40	2:45	2:35	2:40	2:35	2:40	2:50	2:55	2:35	2:40	2:45	2:35	2:35	2:40
R36 (B,C,L,M,N)	2:40	2:45	2:35	2:35	2:35	2:40	2:45	2:55	2:35	2:35	2:40	2:35	2:35	2:40
R37 (A,B,C,L,M,N)	2:45	2:55	2:45	2:50	2:50	2:45	2:55	3:05	2:45	2:55	3:00	2:55	2:45	3:35
R38 (A,B,C,L,M)	2:50	2:55	2:50	2:55	2:55	2:50	2:55	3:10	2:50	2:55	3:05	2:55	2:45	3:45
R39 (A,B,C,D,L,M)	3:15	3:25	3:15	3:20	3:25	3:15	3:30	3:45	3:15	3:20	3:35	3:25	3:15	4:00
R40 (B,C,D,L,M)	3:15	3:20	3:15	3:20	3:30	3:15	3:20	3:35	3:15	3:20	3:30	3:30	3:15	4:00
R41 (A,B,C,D,L,M, N,O,R)	3:15	3:25	3:10	3:15	3:20	3:15	3:20	3:40	3:10	3:20	3:30	3:20	3:10	3:55

MNS ETE Based on 2010 Census

Time to Clear the Indicated Area of 100 Percent of the Affected Population														
	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, EPZ and each County														
R01 (B,C,L,M)	4:30	4:30	4:30	4:30	4:30	4:30	4:35	4:35	4:30	4:30	4:30	4:30	4:30	4:30
R02 (A,B,C,D,L,M,N,O,R)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:00	4:35	4:35	4:35	4:35	4:35	4:45
R03 (All Sub-Zones)	6:10	6:50	5:00	5:25	5:05	6:20	7:15	7:55	5:05	5:15	5:40	5:05	5:00	7:10
R04 (K)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R05 (R,S)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R06 (A,I,J)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:20
R07 (L,M,N,O,P,Q)	4:35	4:50	4:35	4:35	4:35	4:35	4:35	5:05	4:35	4:35	4:35	4:35	4:35	4:35
R08 (A,B,C,D,E,F,G,H)	6:05	6:50	4:45	5:10	4:40	6:20	7:00	7:45	4:40	5:15	5:40	4:40	4:50	7:05
2-Mile Region and Keyhole to 5 Miles														
R09 (B,C,D,L,M,R)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:15
R10 (B,C,L,M,O)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R11 (B,C,L,M,N,O)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R12 (B,C,L,M,N)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35

Figure J-4

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, and Keyhole to 5 miles														
R13 (A,B,C,L,M,N)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:30
R14 (A,B,C,L,M)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:30
R15 (A,B,C,D,L,M)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:45
R16 (B,C,D,L,M)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:40	4:35	4:35	4:35	4:35	4:35	5:20
5-Mile Region and Keyhole to EPZ Boundary														
R17 (A,B,C,D,E,F,L,M,N, O,R,S)	5:55	6:10	5:00	5:10	5:00	6:15	6:30	7:20	5:05	5:10	5:35	5:00	5:05	6:40
R18 (A,B,C,D,E,L,M,N, O,R,S)	4:40	4:40	4:40	4:40	4:40	4:40	4:40	5:10	4:40	4:40	4:40	4:40	4:40	5:40
R19 (A,B,C,D,E,L,M,N, O,Q,R,S)	5:15	6:00	4:55	5:10	4:55	5:35	6:05	6:20	4:55	5:05	5:30	4:55	5:00	5:40
R20 (A,B,C,D,L,M,N, O,Q,R,S)	4:40	4:40	4:40	4:40	4:40	4:40	4:40	5:05	4:40	4:40	4:40	4:40	4:40	5:45
R21 (A,B,C,D,L,M,N, O,P,Q,R,S)	4:40	5:05	4:40	4:40	4:40	4:40	5:05	5:15	4:40	4:40	4:40	4:40	4:40	5:45
R22 (A,B,C,D,L,M,N, O,P,Q,R)	4:40	4:45	4:40	4:40	4:40	4:40	4:40	5:10	4:40	4:40	4:40	4:40	4:40	5:40

Figure J-4

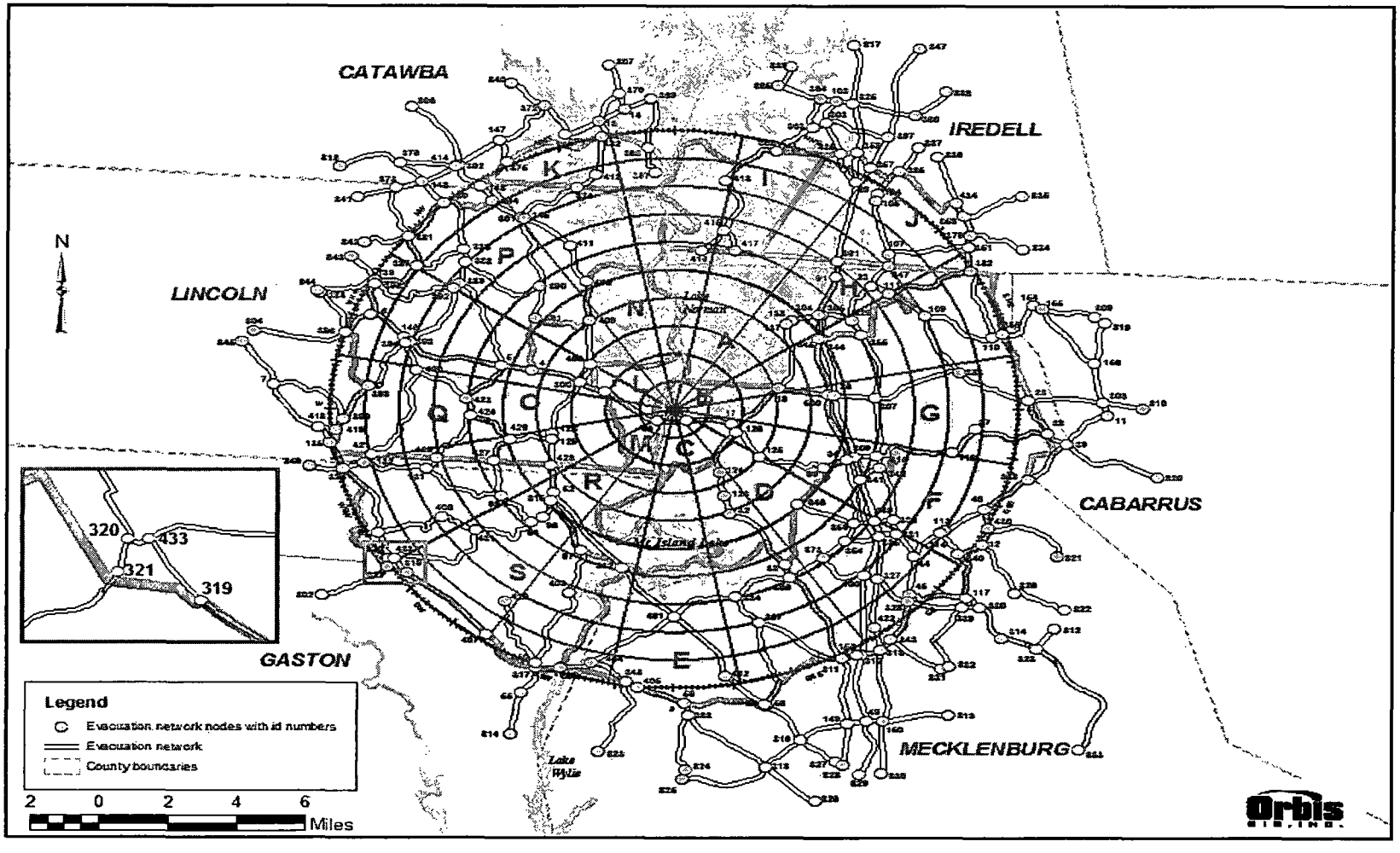
	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
5-Mile Region and Keyhole to EPZ Boundary														
R23 (A,B,C,D,K,L,M,N, O,P,Q,R)	4:40	5:10	4:40	4:40	4:40	4:40	4:50	5:25	4:40	4:40	4:45	4:40	4:40	5:45
R24 (A,B,C,D,I,K,L,M,N, O,P,R)	4:40	5:05	4:40	4:40	4:40	4:40	4:50	5:20	4:40	4:40	4:40	4:40	4:40	5:40
R25 (A,B,C,D,I,J,K,L,M, N,O,P,R)	4:40	5:05	4:40	4:40	4:40	4:40	4:45	5:20	4:40	4:40	4:40	4:40	4:40	5:40
R26 (A,B,C,D,H,I,J,K,L, M,N,O,P,R)	4:40	5:05	4:40	4:40	4:40	4:40	4:45	5:20	4:40	4:40	4:40	4:40	4:40	6:05
R27 (A,B,C,D,G,H,I,J, L,M,N,O,R)	5:05	5:25	4:40	4:40	4:40	4:55	5:30	6:05	4:40	4:40	4:40	4:40	4:40	6:40
R28 (A,B,C,D,F,G,H,J, L,M,N,O,R)	6:00	6:30	4:40	4:55	4:40	6:15	7:05	7:30	4:40	4:45	5:30	4:40	4:55	7:10
R29 (A,B,C,D,F,G,H,L, M,N,O,R)	6:10	6:25	4:40	5:00	4:40	6:20	7:00	7:30	4:40	4:45	5:25	4:40	4:40	7:05
R30 (A,B,C,D,F,G,L,M, N,O,R)	6:10	6:35	4:40	4:45	4:40	6:15	6:55	7:20	4:40	4:45	5:20	4:40	4:40	7:00
R31 (A,B,C,D,E,F,G,L, M,N,O,R)	6:05	6:45	4:45	5:10	4:40	6:15	7:15	7:50	4:50	5:05	5:35	4:40	4:50	6:55
R32 (A,B,C,D,E,F,L,M, N,O,R)	6:00	6:30	4:40	4:50	4:40	6:05	6:35	7:00	4:55	5:00	5:20	4:40	4:55	6:30

Figure J-4

	Summer		Summer		Summer	Winter			Winter			Winter	Winter	Winter
	Midweek		Weekend		Midweek Weekend	Midweek			Weekend			Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Midday		Midday		Evening	Midday			Midday			Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Ice	Good Weather	Rain	Ice	Good Weather	Special Event	Roadway Impact
Staged Evacuation - 2 mile Region and Keyhole to 5 Miles														
R33 (B,C,D,L,M,R)	4:35	4:55	4:35	4:40	4:35	4:35	4:50	5:10	4:35	4:45	5:10	4:35	4:35	5:25
R34 (B,C,L,M,O)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R35 (B,C,L,M,N,O)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R36 (B,C,L,M,N)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35
R37 (A,B,C,L,M,N)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:30
R38 (A,B,C,L,M)	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	4:35	5:30
R39 (A,B,C,D,L,M)	4:40	4:55	4:35	4:45	4:35	4:40	5:05	5:15	4:35	4:45	5:10	4:35	4:35	5:55
R40 (B,C,D,L,M)	4:35	4:55	4:35	4:45	4:35	4:50	4:50	5:10	4:35	4:45	5:10	4:35	4:35	5:25
R41 (A,B,C,D,L,M, N,O,R)	4:55	5:00	4:35	4:45	4:35	5:00	5:10	5:20	4:35	4:50	5:10	4:35	4:35	5:55

Figure J-5

Evacuation Route map for MNS



Rev. 14-5
December, 2014

Figure J-6

Summary of Population and Demand

Sub-Zone	Residents	Transit-Dependent	Transients	Employees	Special Facilities	Schools	Shadow Population	External Traffic	Total
A	18433	335	1478	3632	0	338			24,216
B	931	17	0	2231	0	896			4,075
C	1484	27	0	0	0	0			1,511
D	22994	418	2065	1163	102	4900			31,642
E	37228	674	472	2354	0	4134			44,862
F	30364	552	7850	14154	740	6591			60,251
G	25408	462	1150	3311	149	5356			35,836
H	9665	176	694	2604	0	4826			17,965
I	8053	146	19	121	0	0			8,339
J	7447	135	128	1398	107	1471			10,686
K	2272	41	111	0	0	0			2,424
L	1247	23	13	0	0	0			1,283
M	238	4	0	0	0	0			242
N	5381	98	134	1079	0	509			7,201
O	3705	67	0	501	0	0			4,273
P	10377	189	5232	1048	112	3408			20,366
Q	3394	62	13	56	0	0			3,525
R	1667	30	0	43	0	0			1,740
S	14970	272	0	756	236	1652			17,886
Shadow Region						9085	61906		70,991
Total	205,258	3,728	19,359	34,451	1,446	43,166	61,906		369,314

NOTE: Shadow population has been reduced to 20%.
NOTE: Shadow Facilities include both medical facilities and correctional facilities.

§50.54(q) Screening Evaluation Form **Activity Description and References:** **BLOCK 1**

MNS Emergency Plan Section J - Figure J-1, Offsite Protective Actions rev 14-5 December 2014

This is a document change to provide Protective Action Recommendations (PAR) based upon three new scenarios (Rapidly Progressing Severe Accident (RPSA), Hostile Action and Impediments to Evacuation) during a General Emergency (GE). A new recommendation is to Shelter in Place (SIP) instead of immediate evacuation for given times and type of events.
RPSA only applies to first PAR for initial General Emergency. RPSA is based upon the following criterion: Loss of Containment Barrier per EALs with a potential loss of containment barrier per containment radiation monitors per EALs OR projected radiological release at site boundary to exceed EAL 4.3.G.1 within one hour.
The document change includes using a flowchart and contains the following PAR:

- If event is a Rapidly Progressing Severe Accident (RPSA), then the PAR is Evacuate 2 mile radius, Evacuate 2 - 5 miles downwind and SIP 5 - 10 miles downwind.
- If event is a Hostile Action or Impediments to Evacuation, then the PAR is SIP 2 mile radius and SIP 2 - 5 miles downwind.
- If event is a short term release, then the PAR is SIP 2 mile radius and SIP 2 - 5 miles downwind.
- If any other event has generated a General Emergency, then the PAR is evacuate 2 mile radius and evacuate 2 - 5 miles Downwind.

The document change DELETED the following PAR as compared to the previous revision;

- If containment radiation level exceeds limits in table, evacuate 5 mile radius. This is replaced per the RPSA PAR.
- If wind speed less than 5mph, evacuate 5 mile radius. New PAR has a decision point where OROs can provide input per decision line for an expansion of PAR for various reasons in their zones such adverse weather.
- 100% gap activity release. This is now based on EALs for containment EMF readings which use 20% gap activity release.
- Steps for PAR beyond 10 mile EPZ. These steps are within the Radiation Managers procedure.

This document change is in response to 75772 Federal Register / Vol. 76, No. 233 / Monday, December 5, 2011 / Rules and Regulations where the U.S. Nuclear Regulatory Commission (NRC) is issuing Supplement 3, "Guidance for Protective Action Strategies," to NUREG–0654/FEMA–REP–1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants". This document provides guidance for addressing new EP requirements for nuclear power plants based on changes to EP regulations in 10 CFR 50.47 and Appendix E to Part 50 in the November 23, 2011, final rule. Newly added provision of Part 50, Appendix E, Section IV, paragraph 3.

Planning Standards 50.47(b)(7) and 50.47(b)(10), are impacted by the new PAR process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**	**Change Type:** **BLOCK 4**
☐ The change is editorial or typographical ☒ The change is not editorial or typographical	☐ The change does conform to an activity that has prior approval ☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

- ☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
- ☐ §50.47(b)(2) – Onsite Emergency Organization
- ☐ §50.47(b)(3) – Emergency Response Support and Resources
- ☐ **§50.47(b)(4) – Emergency Classification System***
- ☐ **§50.47(b)(5) – Notification Methods and Procedures***
- ☐ §50.47(b)(6) – Emergency Communications
- ☒ §50.47(b)(7) – Public Education and Information
- ☐ §50.47(b)(8) – Emergency Facility and Equipment
- ☐ **§50.47(b)(9) – Accident Assessment***
- ☒ **§50.47(b)(10) – Protective Response***
- ☐ §50.47(b)(11) – Radiological Exposure Control
- ☐ §50.47(b)(12) – Medical and Public Health Support
- ☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
- ☐ §50.47(b)(14) – Drills and Exercises
- ☐ §50.47(b)(15) – Emergency Responder Training
- ☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Screening Evaluation Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Randy Gibson		10/22/14
Reviewer Name:	**Reviewer Signature**	**Date:**
Marc Mulkey		10/27/14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section J - Figure J-1, Offsite Protective Actions rev 14-5 December 2014 **BLOCK 1**

This is a document change to provide Protective Action Recommendations (PAR) based upon three new scenarios (Rapidly Progressing Severe Accident (RPSA), Hostile Action and Impediments to Evacuation) during a General Emergency (GE). A new recommendation is to Shelter in Place (SIP) instead of immediate evacuation for given times and type of events.

RPSA only applies to first PAR for initial General Emergency. RPSA is based upon the following criterion: Loss of Containment Barrier per EALs with a potential loss of containment barrier per containment radiation monitors per EALs OR projected radiological release at site boundary to exceed EAL 4.3.G.1 within one hour.

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- If event is a short term release, then the PAR is SIP 2 mile radius and SIP 2 - 5 miles downwind.
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The document change DELETED the following PAR as compared to the previous revision;

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This document change is in response to 75772 Federal Register / Vol. 76, No. 233 / Monday, December 5, 2011 / Rules and Regulations where the U.S. Nuclear Regulatory Commission (NRC) is issuing Supplement 3, "Guidance for Protective Action Strategies," to NUREG–0654/FEMA–REP–1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants". This document provides guidance for addressing new EP requirements for nuclear power plants based on changes to EP regulations in 10 CFR 50.47 and Appendix E to Part 50 in the November 23, 2011, final rule. Newly added provision of Part 50, Appendix E, Section IV, paragraph 3.

Activity Type: **BLOCK 2**

☒ The activity <u>is</u> a *change* to the *emergency plan*

☐ The activity affects implementation of the *emergency plan*, but <u>is not</u> a *change* to the *emergency plan*

Impact and Licensing Basis Determination:

BLOCK 3

Licensing Basis:

75772 Federal Register / Vol. 76, No. 233 / Monday, December 5, 2011 / Rules and Regulations states "where the U.S. Nuclear Regulatory Commission (NRC) is issuing Supplement 3, "Guidance for Protective Action Strategies," to NUREG–0654/FEMA–REP–1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants". This document provides guidance for addressing new EP requirements for nuclear power plants based on changes to EP regulations in 10 CFR 50.47 and Appendix E to Part 50 in the November 23, 2011, final rule. Newly added provision of Part 50, Appendix E, Section IV, paragraph 3."

NUREG-0654 FEMA-REP-1, Rev. 1 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Supplement 3, Guidance for Protective Action Strategies" states
"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," updates the previous version of Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents," issued July 1996. Supplement 3 provides a protective action strategy development tool based on recent technical information and is intended for use by nuclear power reactor licensees to develop site-specific protective action recommendation procedures. Offsite response organizations should use Supplement 3 to develop protective action strategy guidance for decision makers. The guidance of Supplement 3 provides an acceptable method to comply with Appendix E to Part 50, Title 10 of the *Code of Federal Regulations* (10 CFR) Section IV, paragraph 3 in the use of evacuation time estimates in the formulation of protective action recommendations (PAR) for the plume exposure emergency planning zone, and provides guidance for the provisions of 10 CFR 50.47(b)(10) in the development of a range of PAR. Supplement 3 also provides guidance to support the information in NUREG-0654/FEMA-REP-1 that the U.S. Nuclear Regulatory Commission finds to be an acceptable method of meeting the requirements in 10 CFR 50.47(b)(7) for the development of a public information program. However, licensees may identify alternative methods of compliance with these requirements."

Appendix E to Part 50, Title 10 of the *Code of Federal Regulations* (10 CFR) Section IV, paragraph 3 states "Nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to the ETEs in the formulation of protective action recommendations and shall provide the ETEs and ETE updates to State and local governmental authorities for use in developing offsite protective action strategies."

10 CFR 50.47(b)(7) states "Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established."

10 CFR 50.47(b)(10) "A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed."

MNS Emergency Plan J.7 Protective Actions Recommendations states "Protective Action Guides are adopted from EPA 400-R-92-001"
EPA 400-R-92-001 states "Public officials are charged with the responsibility to protect the health of the public during hazardous incidents. The purpose of this manual is to assist these officials in establishing emergency response plans and in making decisions during a nuclear incident. It provides radiological protection guidance that may be used for responding to any type of nuclear incident or radiological emergency, except nuclear war. Under regulations governing radiological emergency planning and preparedness issued by the Federal Emergency Management Agency (47 FR 10758, March 11, 1982), the Environmental Protection Agency's responsibilities include, among others, (1) establishing Protective Action Guides (PAGs), (2) preparing guidance on implementing PAGs, including recommendations on protective actions, (3) developing and promulgating guidance to State and local governments on the preparation of emergency response plans, and (4) developing, implementing, and presenting training programs for State and local officials on PAGs and protective actions, radiation dose assessment, and decision making."

MNS Emergency Plan Section D (Emergency Notification System) ENCLOSURE 4.1,BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE states "CONTAINMENT BARRIER EALs: The Containment Barrier includes the containment building, its connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

4.1.C.2 Containment Conditions states "Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity" or "Containment pressure and sump levels should increase as a result of the mass and energy release into containment from a Loss of Coolant Accident (LOCA). Thus, sump level or containment pressure not increasing indicates an interfacing systems LOCA which is a containment bypass and a loss of containment integrity, or some other containment pressure boundary failure".

4.1.C.3 Containment Isolation Valve Status After Containment Isolation Actuation states "Failure to isolate those containment pathways which would allow containment atmosphere to be released from containment is a loss of the containment barrier".

4.1.C.4 Steam Generator (SG) Secondary Side Release With Primary To Secondary Leakage states "Secondary side releases to the environment include those from the condenser air ejectors, CA turbine exhaust, SG Power Operated Relief Valves (PORVs), atmospheric dump valves, faulted steam lines, and main steam safety valves. Steam releases, in combination with primary to secondary leakage, constitute a bypass of the containment and, therefore, a loss of the containment barrier".

4.1.C.5Significant Radioactive Inventory in Containment states "These values indicate significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of NCS Barriers. NUREG-1228, *Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents*, indicates that such conditions do not exist when the amount of clad damage is less than 20%. This amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment."

MNS EPLAN J.8 Evacuation Time Estimates states " An Analysis of Evacuation Time Estimates is available at the site and a summary of the Time Estimates is included in Figure J-3 and Appendix 4.

Under normal weather and for the critical time period (weekday during school hours), the maximum evacuation time for the McGuire EPZ is 4 hours 35 minutes. The critical component in the evacuation is the permanent resident population, all other segments of the population can be evacuated in less than the maximum time.

Under adverse weather conditions (winter storm), the evacuation time for the McGuire EPZ is 5 hours 40 minutes. This evacuation time assumes evacuation of the entire EPZ. Figure J-3 provides more detailed information including evacuation times for individual zones. Appendix 4 discusses the ETE used by the site, state and local planners.

A description of the methods and assumptions used in developing the analysis of evacuation time estimates is included in the current Evacuation Time Estimate study for McGuire Nuclear Site. (MNS-ETE-12132012, Rev. 000; MNS EVACUATION TIME ESTIMATES (ETE) DATED December 2012). The Evacuation Time Estimates will be considered in evaluating protective action recommendations from the Technical Support Center or the Emergency Operations Facility. A copy of the most recent study is available in the MNS Master File under MNS-ETE-12132012.000 or EP Office area.

MNS-ETE-12132012.000 7.6 Staged Evacuation Results states Table 7-3 and Table 7-4 present a comparison of the ETE compiled for the concurrent (unstaged) and staged evacuation studies. Note that Regions R09 through R16 and R02 are the same geographic areas as Regions R33 through R41, respectively. To determine whether the staged evacuation strategy is worthy of consideration, one must show that the ETE for the 2 Mile region can be reduced without significantly affecting the region between 2 miles and 5 miles. In all cases, as shown in Table 7-3 and Table 7-4, the ETE for the 2 mile region is unchanged when a staged evacuation is implemented. As shown in Figure 7-4, there is traffic congestion between 2 and 5 miles to the east of the plant. However, this congestion does not propagate upstream into the 2 mile region. Thus, those evacuating from the 2 mile region are not delayed. While failing to provide assistance to evacuees from within 2 miles of the MNS, staging produces a negative impact on the ETE for those evacuating from within the 5-mile region. A comparison of ETE between Regions, R02 and R09 through R16 and R33 through R41; reveals that staging retards the 90th percentile evacuation time for those in the 2 to 5-mile area by up to 65 minutes (see Table 7-1). This extending of ETE is due to the delay in beginning the evacuation trip, experienced by those who shelter, plus the effect of the trip-generation "spike" (significant volume of traffic beginning the evacuation trip at the same time) that follows their eventual ATE, in creating congestion within the EPZ area beyond 2 miles. In summary, the staged evacuation option provides no benefits to evacuees from within 2 miles and adversely impacts many evacuees located beyond 2 miles from the MNS.

NRC ML 14007A652, EPFAQ 2013-004 Question 3

Question concerns Attachment Note 9: Should the most limiting Evacuation Time Estimate (ETE) for the 0-2 mile zone and 2-5 mile zones downwind be the deciding factor for PAR determination for a Rapidly Progressing Severe Accident?

NRC Response

Clearly one ETE value for the 0-2 mile zone exists and should be used, regardless of wind direction. However, ETE values for 2-5 mile downwind sectors and associated emergency response planning areas could vary substantially. In that case the decision should be based upon wind direction. Use of the longest ETE could potentially prevent evacuation when it is more beneficial than SIP. Licensees could reasonably consider this effect where the relevant ETEs vary by more than about 25%. However, this would only be applicable when some of the 2-5 mile ETEs exceed the guidance in Supplement 3 (i.e., 3 hours); otherwise, evacuation would be recommended regardless of wind direction.

Licensees could justify some other value based on a technical evaluation.

NRC ML 14007A652, EPFAQ 2013-004 Question 4

Attachment block "Evacuate 2 mile radius and SIP 5 miles downwind, all others monitor and prepare" (staged evacuation): Are there circumstances where it is appropriate to not implement staged evacuation. What type of justification is required?

NRC Response

Staged evacuation is the preferred protective action strategy and is shown to be effective according to NRC studies. Staged evacuation emphasizes protection of those members of the public most at risk and limits impact upon the public in the event the General Emergency is mitigated. Staged evacuation is used in emergency response nationwide.

FINAL 6

Licensees can appropriately provide the best technical PAR acknowledging that Offsite Response Organizations' protective action decisions may differ. However, the studies conducted by the NRC to support Supplement 3 used national level parameters for analyses (Ref.: NUREG/CR-6953, Vol. 1, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" (NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML080360602)). Licensees may compare the ETE results for a keyhole evacuation verses a staged evacuation and in some cases perform a site-specific dose-based analysis to show the efficacy of alternate protective action strategies. The techniques in an example document (ADAMS Accession No. ML13269A370) or those in NUREG/CR-6953 may be instructive in the conduct of such analyses. Results must be made available for NRC staff for review.

NRC ML 13269A370

Markup of NRC Draft Response Question 4

The following text was excerpted from NRC EPFAQ 2013-004 Response, Rev 1, dated 8.14.2013 (ML13226A313), Question 4, NRC Response, starting with paragraph four. NEI provides additional underlined text it would like added to the NRC response. A basis for the change is explained below.

However, the studies conducted by the NRC (NUREG/CR-6953, Vol. **1,** "Review of NUREG- 0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,"' ADAMS Accession No. ML080360602) to support Supplement 3 used national level parameters for analyses. Licensees may compare the evacuation time estimate results for a keyhole evacuation verses a staged evacuation and in some cases perform a site-specific dose-based analysis to show the efficacy of alternate protective action strategies. The techniques in the NUREG/CR-6953 may be instructive in the conduct of such analyses and the results should be provided to NRC staff for review. Basis for the Proposed Change to NRC Response 4 NEI requests NRC add the comparison statement to the NRC response. Based on assumptions from NUREG/CR-6953, a comparison of Evacuation Time Estimate (ETE) results can be used to determine the efficacy of alternate protective action strategies. NEI provides an example methodology in Attachment 2. This methodology integrates principles conveyed at the Advisory Committee on Reactor Safeguards (ACRS) - 544th Meeting conducted on Thursday, July 12, 2007 (ACRSR-2263), including a need for strategies that are simple and that consider unique site characteristics. As background, participants at the July 12, 2007 ACRS meeting heard arguments from the NRC staff on the need to revise NUREG-0654 Supplement 3 based on the efficacy of protective action strategies identified in NUREG/CR 6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents". ACRS recommended that updates to Supplement 3 to NUREG-0654/FEMA-REP-1, Revision 1 should take into consideration NUREG/CR 6953 model uncertainties, complexity of decision-making and related industry work. ACRS letter ACDRSR-2263, states "For more slowly progressing source terms, radial evacuation generally performed well, and therefore should remain a major element of protective strategies as recommended in Supplement 3." The letter further states, "The results show that the effectiveness of a strategy is sensitive to the value of ETE..., but do agree with the staff that credible ETEs are important to sound decision-making on PARs. The staff should consider uncertainties in ETEs and other uncertainties such as uniformity of population density (as assumed in the study) may affect the ranking of PAR strategies." NEI's methodology is sensitive to the value of the ETEs and allows licensees the flexibility to select appropriate protective actions based on their unique site characteristics. This includes the option to refrain from staged evacuations in cases where such a strategy would not substantively benefit Page 6 of **18** evacuation times for populations closer to the plant site and would complicate the decision-making process. Because they reflect the non-uniformity of populations in and around nuclear sites, ETE's should be used in ranking the effectiveness of SIP (as used for determining appropriateness of SIP for a Rapidly Progressing Severe Accident), keyhole evacuation, staged evacuation and other PAR strategies at a particular site. The example methodology in Attachment 2 is in line with the principles discussed in the ACRS meeting and the goal of ensuring that PAR strategies resulting from the implementation of Supplement 3 do not overly complicate the decision making process.

NUREG-0654 FEMA-REP-1, Rev. 1 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Supplement 3, Guidance for Protective Action Strategies" states within ***PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL NOTES***

Impediments to evacuation include the following:

• Evacuation support (e.g., traffic control) is not yet in place. In this situation, the GE is the initial notification, or if a previous notification was made, the GE notification occurs before preparations to support an evacuation are complete. Many sites have a low population density within 2 miles, and lack of traffic control may not be considered an impediment. The licensee and OROs should discuss this element and reach an agreement. The licensee and OROs should agree, in advance, on an expected time for evacuation support to be put in place after notification of an emergency classification.
The site-specific protective action recommendation (PAR) procedure for those sites at which a delay of an initial staged evacuation is necessary, pending support setup, should include this time. The licensee would base procedures on the agreement and would not confer with OROs before making the initial PAR notification.

• In a hostile-action-based GE (armed attack), OROs may determine that an initial recommendation to shelter in place (SIP) rather than evacuation is the preferred path. The licensee would discuss this element with OROs and reach an agreement during the development process. The licensee would base procedures on the agreement and would not confer with OROs before making the initial PAR notification.

• In the event of adverse weather, licensees are not responsible for soliciting information or for making a determination that weather or other impediments (e.g., an earthquake or wildfire) for safe public evacuation exist at the time of the emergency. However, the licensee will consider an impediment to exist if OROs have previously notified it of such an impediment (e.g., roadways are closed because of deep snow). During the planning process, OROs may determine that the licensee does not need to consider adverse weather in its plant PAR procedures.

Compliance Evaluation and Conclusion:

Evaluation:

RPSA only applies to first PAR for initial General Emergency. RPSA is based upon the following criterion: Loss of Containment Barrier per EALs with a potential loss of containment barrier per containment radiation monitors per EALs OR projected radiological release at site boundary to exceed EAL 4.3.G.1 within one hour.

RP/0/A/5700/000 (Classification of Emergency) provides the EAL criterion and the basis is found in the **MNS Emergency Plan Section D.**

NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 has the following guidance " Where evacuation cannot be accomplished in the time specified, a recommendation for SIP until the plume has passed is more beneficial. Concerning the 0 - 2 mile radius - If the 90-percent ETE for this area is 2 hours or less, immediately evacuate. IF greater than 2 hours, SIP. Concerning the 2 - 5 mile downwind - If the 90-percent ETE for this area is 3 hours or less, immediately evacuate. Concerning the 5 - 10 mile downwind - SIP, then when safe to do so, evacuate."

NUREG-0654 provides guidance for Sheltering in Place (SIP) based upon Rapidly Progressing Severe Accident (RPSA) if evacuation exceeds two hours for the two mile radius. SIP is based upon Evacuation Time Estimates for 90% population. The ETE for two hours was exceeded for the 2 mile radius during Midweek Midday for rain/ice.

NUREG-0654 provides guidance for Sheltering in Place (SIP) based upon Rapidly Progressing Severe Accident (RPSA) if evacuation exceeds three hours for 2 - 5 miles downwind. SIP is based upon Evacuation Time Estimates for 90% population. The greater than 3 hour requirement for 2 -5 miles downwind for SIP per ETE 90% had one time that exceeded 3 hours due to ice. This time was 3:10 for the 2 mile radius region and keyhole to 5 miles. There were several other ETEs that exceeded 3 hours for Midday and Roadway Impact for the 2 mile radius region and keyhole to 5 miles. OROs have option to request the site not to issue an evacuation PAR based upon impediments. These ETEs are based upon 2 mile radius region and keyhole to 5 miles.

NUREG-0654 provides guidance for Sheltering in Place (SIP) based upon Rapidly Progressing Severe Accident (RPSA) per Supplement 3 guidance the PAR for 5 - 10 miles downwind is SIP at all times.

NRC ML 14007A652, EPFAQ 2013-004 Question 3 had NRC Response " Licensees could justify some other value based on a technical evaluation."

NRC ML 14007A652, EPFAQ 2013-004 Question 4 had NRC Response "Licensees may compare the ETE results for a keyhole evacuation verses a staged evacuation and in some cases perform a site-specific dose-based analysis to show the efficacy of alternate protective action strategies."

NRC ML 13269A370 was published as the NEI response to EPFAQ 2013-004 where NEI provided methodology for allowing licenses to perform evacuations in lieu of SIP. The final of ML 13269A370 allowed NEI to place this methodology into NEI 12-10.

KLD TR – 682 KLM 11-3-14

As per these regulations and guidance documents, Duke Energy ~~has~~ contracted KLD to complete Appendix D (Worksheets 1 and 2) of NEI 12-10 for the development of the MNS PAR procedure. This report utilizes the MNS 2012 ETE to determine the PAR for a Rapidly Progressing Severe Accident (RPSA) and to determine if a staged evacuation is beneficial for the MNS site. Block G of Appendix A of NEI 12-10, Steps 1 through 4 are also analyzed for completeness.

Rapidly Progressing Severe Accident

The results for the 5 step process are outlined below for MNS: Step 1. The average 90th percentile ETE (excluding the special event and the roadway impact scenarios) for the full EPZ (Region R03) is 4 hours and 10 minutes. This is greater than 3 hours
so the radial regions are to be evaluated individually using Steps 2 through 4. Step 2. The average 90th percentile ETE value for the 2 mile Region (V) for midday is 2 hours and 21 minutes, which is longer than 2 hours. As discussed in the methodology above, a 25% variance factor can be applied (in accordance with NRC EPFAQ 2013-004) as the ETE is close to 2 hours. This 25% variance factor makes the criterion 2 hours and 30 minutes. Thus, V equal to 2 hours and 21 minutes is less than 2 hours and 30 minutes, and the midday PAR for the 2 mile Region is to evacuate. The average 90th percentile ETE value for the 2 mile Region for evening is 1 hour and 50 minutes, which is less than 2 hours. As such, the evening PAR for the 2 mile Region is to evacuate. Thus, during the midday and evening, the 2 mile Region will evacuate for an RPSA. Step 3. Table 2 presents the RPSA PARs for each 2-5 mile Region for Scenario 6, where V equals 3 hours and 11 minutes. Table 3 presents the RPSA PARs for each 2-5 mile Region for Scenario 12, where V equals 2 hours and 40 minutes. Table 2 and Table 3 are adapted from Worksheet 1, Table 1 of NEI 12-10. As shown, the 2-5 mile Region evacuates for all wind directions for both of the bounding scenarios considered.

Step 4. Based on the Step 1 analysis the 5-10 Mile Region should SIP during an RPSA. Step 5. Duke Energy and the OROs should work together to ensure the protective action strategy properly accounts for impediments.

UREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 states "In a hostile-action-based GE (armed attack), OROs may determine that an initial recommendation to shelter in place (SIP) rather than evacuation is the preferred path."

If event is a Hostile Action or Impediments to Evacuation, then the PAR is SIP 2 mile radius and SIP 2 - 5 miles downwind.

NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 states "The site-specific protective action recommendation (PAR) procedure for those sites at which a delay of an initial staged evacuation is necessary, pending support setup, should include this time." Any impediments to allow an evacuation within the ETE is considered as exceeding the ETE. If event is a Hostile Action or Impediments to Evacuation, then the PAR is SIP 2 mile radius and SIP 2 - 5 miles downwind.

RP/0/A/5700/012 Enclosure 19 and RP/0/B/5700/029 current revisions have a Caution which implies that Sheltering in lieu of evacuation should be considered during short term release. PIP M-05-3611. If event is a short term release during expanded PAR, then the PARs are SIP 2 mile radius and SIP 2 - 5 miles downwind. This caution is now an action step and will not be discussed any further.

BLOCK 4

EPA 400-R-92-001 states "The primary objective of evacuation is to avoid exposure to airborne or deposited radioactive material by moving individuals away from the path of the plume. Evacuation, if completed before plume arrival, can be 100 percent effective in avoiding future exposure. Even if evacuation coincides with or follows plume passage, a large reduction of exposure may be possible."
MNS EPlan Figure J-3 provides data to evacuate a 5 mile radius verses 2 mile radius and Keyhole to 5 miles. The greatest time for ETE for a five mile radius is 5 hours and 45 minutes. The greatest time for ETE for a 2 mile radius and Keyhole to 5 miles is 3 hours and 10 minutes excluding a road impediment.
EPA 400-R-92-001 states " Sheltering may be an appropriate protective action because: *1.* It positions the public to receive additional instructions when the possibility of high enough doses to justify evacuation exists, but is small. *2.* It may provide protection equal to or greater than evacuation. *3.* It is less expensive and disruptive than evacuation. *4.* Since it may be implemented rapidly, sheltering may be the protective action of choice if· rapid evacuation is impeded by, a) severe environmental conditions--e.g. severe weather or floods; b) health constraints--e.g. patients and workers in hospitals and nursing homes; or c) long mobilization times--certain industrial and farm workers, or prisoners and guards; d) physical constraints to evacuation--e.g. inadequate roads. *5.* Sheltering may be more effective against inhalation of radioactive particulates than against external gamma exposure, especially for short term plumes."
MNS Emergency Plan J.7 Protective Actions Recommendations states "Protective Action Guides are adopted from EPA 400-R-92-001".
NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 states "This guidance should not affect the use of the protective action guidelines developed and issued by the U.S. Environmental Protection Agency (EPA). The EPA protective action guides (EPA, 1992) remain the appropriate Federal guidance on radiological criteria for consideration of protective actions."
MNS EPLAN J.8 Evacuation Time Estimates references the MNS-ETE-12132012.000 for the data used for the ETEs.
MNS-ETE-12132012.000 7.6 Staged Evacuation Results states "In summary, the staged evacuation option provides no benefits to evacuees from within 2 miles and adversely impacts many evacuees located beyond 2 miles from the MNS."
NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 states "Extreme weather conditions, such as inversion, significant precipitation, or no wind, can change the efficacy of SIP and make evacuation the preferred protective action."

Conclusion:

Rapidly Progressing Severe Accident (RPSA) only applies to first PAR after initial General Emergency via criterion for Loss of Containment Barrier per EALs with a potential loss of containment barrier per containment radiation monitors per EALs **OR** projected radiological release at site boundary to exceed EALs within one hour. A loss of containment barrier alone does not have enough points to generate a General Emergency per the EALs therefore two other fission product barriers are lost or one other fission product barrier is lost with a potential loss of the other. Once a GE is declared then containment must be evaluated for a Loss of Containment Barrier then containment radiation monitors and dose at site boundary must be evaluated to determine if a RPSA applies. The potential loss of containment barrier per the EALs using the containment radiation monitors EMF51A and EMF51B is based on 20% fuel failure is more conservative for taking expedite actions for protecting the health and safety of the public as compared to 100% fuel failure in the previous revision of this procedure. The projected radiological release at site boundary to exceed EALs within one hour is a conservative measure for the protection of the health and safety of the public. **MNS Emergency Plan Section D (Emergency Notification System)** is not challenged. IF RPSA criteria is met, then affective actions are taken to ensure the health and safety of the public therefore the actions to determine PAR for a RPSA continues to comply with the requirements .
NUREG-0654 also provides guidance for SIP in place based upon Hostile Action or Impediments to Evacuation.
EPA 400-R-92-001 supports SIP and states that Since it may be implemented rapidly, sheltering may be the protective action of choice .
EPA 400-R-92-001 is also the basis for the **MNS EPlan Section J -** PAR.
NUREG-0654 states that staged evacuation may be the preferred evacuation but MNS-ETE-12132012.000 provides a summary that a staged evacuation adversely impacts many evacuees therefore staged evacuation is not a recommendation
KLD TR – 682 supports evacuating and not using staged evacuation using the methodology per NEI 12-10.
NRC ML 13269A370 endorsed the NEI methodology that is used in Appendix D of NEI 12-10.
NRC ML 14007A652, EPFAQ 2013-004 Question 3 and 4, NRC response allowed license to perform a technical evaluation. KLD TR-682 is the evaluation.
Based upon Supplement 3 guidance and KLD TR-682; These PAR for RPSA changes take into consideration the health and safety of the pubic where evacuation can actually reduce dose where members of the general public evacuate the two mile radius and 2-5 miles downwind and SIP 5 -10 miles downwind.
Based upon Supplement 3 guidance; These PAR changes take into consideration the health and safety of the pubic where SIP can actually reduce dose where members of the general public could be overtaken by the radioactive plume taking into account that sheltering inside their homes would be more protective than trying to make a quick evacuation where traffic or other impediments could slow down the evacuation.
Based upon Supplement 3 guidance; These PAR changes take into consideration the health and safety of the pubic where SIP can actually reduce dose where members of the general public could be overtaken by the radioactive plume taking into account that sheltering inside their homes would be more protective than trying to make a quick evacuation where a security event could slow down the evacuation.
Based upon Supplement 3 guidance; Actions are taken for expanded PAR for the OROs and licensee to make decisions to evacuate areas that are SIP based upon removal of impediments, adverse weather or other factors. SIP provides affective actions to ensure the health and safety of the public therefore these changes continue to comply with the requirements.
If any other event has generated a General Emergency, then the PAR is evacuate 2 mile radius and evacuate 2 - 5 miles Downwind.

These changes comply with **10 CFR 50.47(b)(7), 10 CFR 50.47(b)(10) and Appendix E to Part 50, Title 10 of the *Code of Federal Regulations* (10 CFR) Section IV, paragraph 3.**

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

Evaluation:

This document change is in response to 75772 Federal Register / Vol. 76, No. 233 / Monday, December 5, 2011 / Rules and Regulations where the U.S. Nuclear Regulatory Commission (NRC) is issuing Supplement 3, "Guidance for Protective Action Strategies," to NUREG–0654/FEMA–REP–1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants". This document provides guidance for addressing new EP requirements for nuclear power plants based on changes to EP regulations in 10 CFR 50.47 and Appendix E to Part 50 in the November 23, 2011, final rule. Newly added provision of Part 50, Appendix E, Section IV, paragraph 3.

Protective Action Recommendations (PAR) based upon three new scenarios (Rapidly Progressing Severe Accident (RPSA), Hostile Action and Impediments to Evacuation) during a General Emergency (GE) provides the recommendation to Shelter in Place (SIP) instead of immediate evacuation for a given event under various circumstances.

MNS Emergency Plan J.7 Protective Actions Recommendations states "Protective Action Guides are adopted from EPA 400-R-92-001".

NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 states "This guidance should not affect the use of the protective action guidelines developed and issued by the U.S. Environmental Protection Agency (EPA). The EPA protective action guides (EPA, 1992) remain the appropriate Federal guidance on radiological criteria for consideration of protective actions."

NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 has the following statement concerning the health and safety of the public

The regulation at 44 CFR 350.5(10) states, in part, "Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place...." Offsite response organizations (OROs) should consider using this guidance to develop appropriate protective action strategies. Nothing in this guide should be interpreted as interfering with State, Tribal, and local ORO authority to determine the appropriate protective action strategies and decision making protocols for the protection of public health and safety during a radiological emergency."

Appendix E to Part 50, Title 10 of the *Code of Federal Regulations* (10 CFR) Section IV, paragraph 3 states "Nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to the ETEs in the formulation of protective action recommendations and shall provide the ETEs and ETE updates to State and local governmental authorities for use in developing offsite protective action strategies."

NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3, Guidance for Protective Action Strategies" states within ***PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL NOTES*** the impediments to evacuation.

10 CFR 50.47(b)(7) states "Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established."

10 CFR 50.47(b)(10) "A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed."

KLD TR – 682 supports evacuating and not using staged evacuation using the methodology per NEI 12-10.

NRC ML 13269A370 endorsed the NEI methodology that is used in Appendix D of NEI 12-10.**NRC ML 14007A652, EPFAQ 2013-004 Question 3 and 4,** NRC response allowed license to perform a technical evaluation. KLD TR-682 is the evaluation

Conclusion:

It is a requirement that MNS adheres to NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 as a direction by the NRC per 75772 Federal Register / Vol. 76, No. 233 / Monday, December 5, 2011 / Rules and Regulations. Since MNS EPlan Protective Action Guides are adopted from EPA 400-R-92-001 and NUREG-0654 FEMA-REP-1, Rev. 1 Supplement 3 does not affect the EPA guidelines therefore there is no impact on the MNS EPlan or the Protected Action Guides (PAGs).

KLD Engineering performed the ETEs for MNS as described in MNS Emergency Plan Section J. KLD Engineering generated KLD TR-682 (Development of Protective Action Strategy) using methodology from Appendix D of NEI 12-10. KLD TR-682 only applies to RPSA. The methodology was endorsed by the NRC per ML 13269A370 per the NEI letter to the NRC per EPFAQ 2013 and then NEI added the methodology to Appendix D of NEI 12-10.

These PAR changes take into consideration the health and safety of the pubic where evacuation can actually reduce dose where members of the general public evacuate the two mile radius and 2-5 miles downwind.

Duke Energy Fleet and MNS has placed into procedures PAR for impediments to evacuation per recommendations of NUREG-0654 FEMA-REP-1, Rev. 1 , Supplement 3, using *PROTECTIVE ACTION STRATEGY DEVELOPMENT TOOL NOTES.* MNS continues training and discussions with offsite agencies for PAR.

These PAR changes take into consideration the health and safety of the pubic where SIP can actually reduce dose where members of the general public could be overtaken by the radioactive plume taking into account that sheltering inside their homes would be more protective than trying to make a quick evacuation where traffic, other impediments or security event could slow down the evacuation.

Actions are taken for expanded PAR for the OROs and licensee to make decisions to evacuate areas that are SIP based upon removal of impediments, adverse weather or other factors. SIP provides affective actions to ensure the health and safety of the public

MNS continues to provide information to residents within the 10 mile EPZ as described in **10 CFR 50.47(b)(7).**

MNS continues to provide PAR to ensure the health and safety of the public as described in **10 CFR 50.47(b)(10).**

These PAR changes adhere to providing PAR using the ETEs as described in **Appendix E to Part 50, (10 CFR) Section IV, paragraph 3.**

This activity does not constitute a reduction in effectiveness.

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 10/22/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 11/4/14
Approver Name: **Kevin L. Murray**	Approver Signature	Date: 11-11-14

N. EXERCISES AND DRILLS

N.1.a Exercises

McGuire Nuclear Site will conduct emergency exercises in accordance with the requirements of 10CFR50 Appendix E.

The Emergency Operations Facility will participate in each exercise involving full participation by the affected state or local governments.

N.1.b Exercise Scenario/Response

The exercises will be designed to test the integrated capability of those involved and a major portion of the basic elements existing within the plans and organizations. The scenario for these exercises will be varied from exercise to exercise such that all major elements of the plans and organizations will be tested within a six year period. The exercise will be initiated at various times of the day, but in every six year period, one exercise will begin between 6:00 P.M. and 4:00 A.M.

N.2 Drills

McGuire Nuclear Station will conduct drills in accordance with 10CFR50, Appendix E to ensure that adequate emergency response capabilities are maintained between exercises. At least one drill will be conducted between exercises involving a combination of the principal functional areas of McGuire's on-site emergency response capabilities. {PIP 0-G98-0023}

Drills shall be conducted to test, develop and maintain skills in a particular operation. Drills may be a component of an exercise. Drills will be conducted and evaluated by a designated drill director. Drills will be held in accordance with PT/0/A/4600/097, Procedure for Preparing and Conducting Emergency Exercises/Drills, and FAM 3.19, Drills and Exercises.

N.2.a Communications

1. Monthly checks are conducted with the state of North Carolina and with Mecklenburg, Gaston, Catawba, Cabarrus, Lincoln, and Iredell Counties.

2. Monthly checks are also conducted with the NRC Headquarters from the Control Room and EOF. The ENS phone located in the TSC is checked in conjunction with the monthly call from the Control Room. Also a monthly call to the National Weather Service will be made to ensure accessibility.

3. Quarterly checks with Federal emergency response organizations are considered complete with the monthly call to the NRC. The state of North Carolina in the ingestion pathway is called monthly. The state of South Carolina is called quarterly.

4. Annual communications checks are performed between the Control Room, TSC, and EOF; and between the McGuire facility and the North Carolina EOC, Mecklenburg, Gaston, Catawba, Cabarrus, Lincoln and Iredell Counties' EOCs and the field monitoring teams.

5. Annual checks are conducted with Federal emergency response organizations, Dept. of Energy's Savannah River Plant and REAC/TS in Oak Ridge, Tenn. See PT/0/A/4600/089, Periodic Test of Control Room and TSC DEMNET, ENS and Duke ETS.

6. Periodic drills conducted with the ERO teams throughout each calendar year include the aspect of understanding the content of messages.

N.2.b Fire drills shall be conducted in accordance with Nuclear System Directive (NSD) 112, Fire Brigade Organization Training and Responsibilities.

N.2.c Medical emergency drills involving a simulated contaminated and injured individual which contains provisions for participation by the local ambulance service shall be conducted annually. The offsite portion of the medical drill may be performed as part of the required biennial exercise.

N.2.d Station environs and radiological monitoring drills (onsite and offsite) shall be conducted annually. These drills shall include collection and analysis of all sample media (e.g. water, vegetation, soil and air).

N.2.e Radiation Protection drills shall be conducted semi-annually which involve response to and analysis of, simulated elevated airborne and liquid samples and direct radiation measurements in the environment. Analysis of samples may be simulated in Radiation Protection drills.

NOTES:

1. Due to ALARA considerations actual elevated samples will not be used in drills.

2. Radiation Protection and Chemistry personnel perform analyses of similar nature routinely and therefore are not required to perform the analysis for drills.

N.3 Exercise and Drill Execution

The Emergency Planning Group is responsible for the overall development and direction of the biennial exercise. An Exercise Director and a key group of controllers will develop the exercise scenario, exercise messages, and simulated data for the site and off-site areas. The Exercise Director will, for each exercise, develop an exercise plan. This plan will include objectives of the exercise and evaluation criteria, the date, time, place, and participating organizations, the exercise scenario, a narrative summary of the event including such things as emergency classification at various times in the simulated accident, off-site assistance, some detail on plant conditions, and a description of the arrangements for official observers.

N.4 Exercise Critique

A critique will be held following each exercise. The critique will be a closed session between Duke and the Nuclear Regulatory Commission. During the critique, the Emergency Planning Manager, the Exercise Director, the NRC and other official observers from state, federal or local governments will make preliminary evaluations of the emergency response.

N.5 Critique Action Items

The verbal evaluations made during the critique and any follow-up written evaluation will be compiled into a Critique Summary. Items from the Critique Summary will be entered into the Problem Investigation Process (PIP). Through this process, items will be tracked until completed. Completion dates will be established during development of the critique summary. The Emergency Planning Manager acting under the authority of the Site Vice President will ensure resolution of each item.

§50.54(q) Screening Evaluation Form **Activity Description and References: MNS Emergency Plan Section N (Exercises and Drills) Rev 14-5 December 2014**

BLOCK 1

Page N-2 Changed from "Selective Signaling" to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, includes information on how to operate DEMNET.

DEMNET was incorporated to remove the Selective Signaling System and on the use of the new communication network, for making emergency notifications to off-site agencies by initiating group calls to the government agencies using DEMNET "~~MSN~~ Notify".

MNS 7<1m 1t 3-14

Planning Standards 50.47(b)(5) and 50.47(b)(6), are impacted by the new DEMNET process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope:

BLOCK 2

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**	**Change Type:** **BLOCK 4**
☐ The change is editorial or typographical ☒ The change is not editorial or typographical	☐ The change does conform to an activity that has prior approval ☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

- ☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
- ☐ §50.47(b)(2) – Onsite Emergency Organization
- ☐ §50.47(b)(3) – Emergency Response Support and Resources
- ☐ **§50.47(b)(4) – Emergency Classification System***
- ☒ **§50.47(b)(5) – Notification Methods and Procedures***
- ☒ §50.47(b)(6) – Emergency Communications
- ☐ §50.47(b)(7) – Public Education and Information
- ☐ §50.47(b)(8) – Emergency Facility and Equipment
- ☐ **§50.47(b)(9) – Accident Assessment***
- ☐ **§50.47(b)(10) – Protective Response***
- ☐ §50.47(b)(11) – Radiological Exposure Control
- ☐ §50.47(b)(12) – Medical and Public Health Support
- ☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
- ☐ §50.47(b)(14) – Drills and Exercises
- ☐ §50.47(b)(15) – Emergency Responder Training
- ☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Screening Evaluation Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Randy Gibson		9/23/14
Reviewer Name:	Reviewer Signature	Date:
Marc Mulkey		10/22/14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: **Emergency Plan Section N (Exercises and Drills) Rev 14-5 December 2014**

BLOCK 1

Page N-2 Changed "Selective Signaling to "DEMNET"

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

N 4/23/14 ew Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, will also be issued. The new Fleet procedure includes information on how to operate DEMNET.

DEMNET changes were incorporated to remove the Selective Signaling System and add instructions on the use of the new communication network, DEMNET. Step details for using the old Selective Signaling system were deleted or replaced with instructions for using DEMNET. Step details for using DEMNET include the following: Initiating group calls to the government agencies with the DEMNET "~~MCN~~ MNS Notify" button, use of the Alternate DEMNET buttons, and notes containing supplemental information. TKZM 11-3-14

Additional information regarding this change:

The Selective Signaling emergency communications system has been the primary method of prompt communication to State and local Offsite Response Organizations (OROs) from the McGuire Nuclear Station (MNS) for many years. Within the confines of MNS, Selective Signaling operates as part of the normal plant communications system (i.e. internal extensions, commercial phones, etc.). Beyond the boundaries of MNS, Selective Signaling transmits over analog lines that are leased from local telephone providers. In the past, these lines have been subject to damage by natural and man-made causes or other failures such that all or part of communication ability of MNS to or from some or all of the OROs via Selective Signaling has been lost for various periods of time.

Since Selective Signaling is an unmonitored system, it is typically not known that problems exist until the system is used (i.e., during periodic testing, communication checks, drills, etc.). When problems are identified and reported, it is up to the local telephone provider to determine when the repair(s) can be made. In addition to the less than reliable service for the Selective Signaling system, Duke Energy has been notified by local telephone providers that due to the frequency of failures and the ever increasing difficulty in obtaining repair parts / materials, they will no longer be able to provide repair / maintenance support of the antiquated system beyond 2014.

As a solution for this, Duke Energy has selected Emergency Management Network (EMnet) as provided by the vendor, Communications Laboratories (Comlabs). EMnet is currently in use by a number of Federal, State, and local government agencies, and is being implemented by an increasing number of nuclear stations / utilities. EMnet will be referenced as DEMNET for the remainder of this evaluation. Comlabs provides hardware, software, training, installation and other services necessary for DEMNET to operate. DEMNET is being implemented across the Duke Energy Fleet as a replacement for Selective Signaling.

DEMNET allows the Control Room, Technical Support Center (TSC), Emergency Operations Center (EOF), and alternative response facilities to communicate with Offsite Response Organizations and/or with each other using VoIP (voice-over-internet protocol) as the primary method. In the event of internet related problems (i.e., slow data transfer rate, unavailability, etc.), the system automatically transfers to satellite communication as a backup. Like Selective Signaling, DEMNET allows internal and external point-to-point contact between individual stations as well as simultaneous conferencing with multiple stations. This ability is a valuable backup to existing telephone circuits. The point-to-point

capability also allows DEMNET to continue to provide Decision Line capability, which enables ORO decision makers to use the system to discuss public protective actions over dedicated / controlled access communication links.

Via the dedicated DEMNET computer, historical and real-time system status can be readily determined. DEMNET is also monitored by the vendor, Comlabs. This allows for a more proactive approach in identification and resolution of problems associated with the system should they occur. In the event of failure, the application of suitable compensatory measures (i.e., use of back up communications) can be made in a more efficient and effective manner.

No changes are made to the communications systems that currently serve as a backup to Selective Signaling or the associated implementation process(es) for employing them.

DEMNET equipment installed and operated at Duke Energy nuclear plants and support facilities is installed and maintained to meet cyber security requirements in accordance with 10 CFR 73.54 and other related guidance.

As part of the installation process, DEMNET has been extensively tested to ensure connectivity / operability before being placed in service. Duke Energy Emergency Response Organization and Emergency Preparedness, along with personnel from Offsite Response Organizations have received training on the new system as well.

As configured, the network that DEMNET resides within MNS causes the system to be powered from various sources based upon the physical location of the individual components within the network. In the event normal and/or backup power supplies become unavailable, and as a result, DEMNET and all other backup communications system become non-functional, MNS and the OROs have a number of battery powered portable satellite phones available that can be placed into service in an effort to maintain the capability of providing prompt communications between MNS and the OROs.

Upon implementation across the Duke Energy Fleet and its State and local Offsite Response Organizations, the product name "EMNet" is replaced with the new system name "Duke Emergency Management Network (DEMNET)". The name "Selective Signaling" will no longer be used, while the name "Decision Line" will continue to be used.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*
☐ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

- 10 CFR 50.47(b)(5) - Notification Methods and Procedures (Risk Significant Planning Standard) states: "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

  The applicable emergency planning function associated with 10 CFR 50.47(b)(5) states: "Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications."

- 10 CFR 50.47(b)(6) – Emergency Communications states: "Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The applicable emergency planning functions associated with 10 CFR 50.47(b)(6) state:

- Systems are established for prompt communication among principal emergency response organizations.
- Systems are established for prompt communication to emergency response personnel

Licensing Basis:

This evaluation included a search of McGuire Nuclear Station (MNS) licensing basis documents for references to the Selective Signaling system. The search concluded that a review of the Duke Energy McGuire Nuclear Station (MNS) Emergency Plan was warranted.

While the MNS Emergency Plan contains several references to Selective Signaling, there are no details within the Emergency Plan regarding usage of the system, other than to indicate that it is the primary system used for prompt communications to the offsite response organizations. DEMNET is replacing Selective Signaling as the primary system used for prompt communications to the offsite response organizations.

Other references within the MNS Emergency Plan include facility diagrams which indicate the location of Selective Signaling telephones. DEMNET equipment is replacing Selective Signaling in each location where Selective Signaling was present.

The MNS Emergency Plan also references periodic testing of Selective Signaling. DEMNET will be tested in a similar manner and frequency as was Selective Signaling.

Consequently, the replacement of the Selective Signaling system with DEMNET within the MNS Emergency Plan will constitute a name change only.

This review concludes that changes to this document relative to the replacement of Selective Signaling with DEMNET do not affect the licensing basis of the MNS Emergency Plan. The changes in this revision support replacement of the Selective Signaling telephone system, which is used for notifications to state/county agencies, with a new dedicated telephone system called the Duke Emergency Management Network (DEMNET). These changes support a Duke Energy fleet-wide initiative to upgrade the dedicated telephone system for notifying state/county agencies of a declared emergency as an overall enhancement to emergency preparedness. These changes meet or exceed all emergency preparedness requirements based on NRC regulations and requirements.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

10 CFR Part 50, Appendix E, Section IV.D.1 states the following:
Administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary, shall be described. This description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs.

10 CFR Part 50, Appendix E, Section IV.D.3 states the following, in part:
A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate ...

10 CFR Part 50, Appendix E, Section IV.E.8.d states the following, in part:
For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: ... the capability to perform offsite notifications; ....

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 2.7, states, in part:
The TSC voice communication equipment shall include:

- Hotline telephone ...
- Dedicated telephone ...
- Dial telephones ...

- Intercommunications systems ...
- Communications ... to State and local operations center prior to EOF activation.

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 4.6, states, in part:
The EOF shall have reliable voice communications facilities to the TSC, the control room, NRC, and State and local emergency operations centers. The normal communication path between the EOF and the control room will be through the TSC. The primary functions of the EOF voice communications facilities will be:

- EOF management ...
- Communications ...
- Communications ...
- Communications to coordinate offsite emergency response activities, and
- Communications ... .

NUREG-0654 (Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants), Section II.F, states, in part:

1. The communications plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local, and State response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:

   a. provision for 24-hour per day notification to and activation of the State/local emergency response network; and at a minimum, a telephone link and alternate, including 24-hour per day manning of communications links that initiate emergency response actions.

   b. provision for communications with contiguous State/local governments within the Emergency Planning Zones;

   c. provision for communications ...

   d. provision for communications ...

   e. provision for alerting or activating emergency personnel in each response organization; and provision for communication ...

The replacement of Selective Signaling and Decision Line (SS/DL) with DEMNET continues to comply with applicable regulations and commitments by providing a dedicated method of contacting State and local authorities in a timely manner during an emergency.

Compliance is maintained in the following manner:

1. DEMNET is a dedicated system for communication with OROs that is capable of establishing contact within 15 minutes of emergency declaration. This is consistent with the capability of the SS/DL system.

2. DEMNET stations are present in the Control Room, TSC, EOF, and alternative facilities which are capable of initiating or receiving point-to-point or conference calls with any ORO site similarly equipped. This is consistent with the capability of the SS/DL system.

3. Compatible DEMNET stations are installed in all ORO locations that were serviced by the SS/DL system.

4. The TSC has an DEMNET station to allow communication with State and local OROs prior to EOF activation. This capability existed with the existing SS/DL system.

5. DEMNET is a voice communications system with dedicated stations located in the Control Room, TSC, EOF, alternative facilities, and State/local emergency operations centers and is capable of coordinating

offsite response activities via point-to-point or conference calling. Communications with NRC is conducted using a separate system unrelated to DEMNET. This is consistent with the SS/DL system.

NOTE: In addition to voice communications, DEMNET is also capable of transmitting data. The voice communications feature of DEMNET is the replacement for SS/DL voice communications capability.

6. DEMNET has redundant features to maintain communication capability in the event of system failure or degradation. During normal operation, DEMNET employs voice-over-internet protocol (VoIP) technology
to establish contact between stations. Should internet problems (unavailability, slow transfer rate, etc.) occur, the system will automatically shift to satellite communication as a backup. This backup feature is an enhancement that SS/DL did not have. Failure of the SS/DL system required the use of the commercial telephone system to re-establish communications.

7. By locating an DEMNET station in the continuously staffed Control Room, the licensee provides 24-hour per day capability to establish links to initiate emergency response actions.

8. DEMNET stations are established at each contiguous State/local emergency response agency within the EPZ. This is consistent with the usage of the SS/DL system.

- 10 CFR 50.47(b)(5) states the following:

"Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

The function of this planning standard pertinent to this change is the establishment of procedures for State and local governmental agencies that are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

- 10 CFR 50.47(b)(6) states the following:

"Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The function of this planning standard pertinent to the change is that systems be established for prompt communications among principal response organizations.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:
The screening of this change has identified two (2) affected planning standard functions described above:

1. Procedures for notification of State and local government agencies are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

Additional procedures are currently in effect for notification of State and local agencies following a declared emergency. These procedures explicitly require that such notification occur within 15 minutes of emergency declaration.

Station procedures were originally intended to address notifications using the Selective

Signaling/Decision Line (SS/DL) system and have likewise been revised to address the change to DEMNET. The functionality and utility of the procedures remain unaffected by the proposed change. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

2. Systems are established for prompt communication to emergency response personnel.

   The SS/DL system suffered from obsolescence and eroding vendor support. The communications carriers currently providing service for the system informed the licensee that all support will terminate at the end of 2014. This prompted the change to DEMNET, a communications system widely used in the emergency response community.

   As described above, DEMNET possesses all of the capabilities of SS/DL with additional enhancements not found in the former system. Significant among these is the use of robust VoIP technology and automatic "failover" to satellite communications in the event of a failure or degradation of the primary internet flowpath. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

   The evaluation concludes that the change does not impact either applicable planning function negatively and therefore does not constitute a reduction in effectiveness.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/23/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 10/22/14
Approver Name: Kevin L. Murray	Approver Signature	Date: 11-11-14

P. RESPONSIBILITY FOR THE PLANNING EFFORT

To assure that responsibilities for plan development, review and distribution of emergency plans are established and that the Emergency Planning staff are properly trained.

P.1 Emergency Planning Staff Training

Emergency Planning Group personnel will attend training/workshops, information exchange meetings with other licensees, and conferences held by industry and government agencies, as available, to maintain current knowledge of the overall planning effort. The Emergency Planning Manager is required to attend offsite training on an annual basis. This training will be documented in site Emergency Planning files or the Training group database (i.e. People Soft, etc.).

P.2 Emergency Response Planning

The Site Vice President has the overall authority and responsibility for the Site Emergency Plan. This planning effort is delegated to the Emergency Planning Manager.

P.3 Site Emergency Planning Manager

The Emergency Planning Manager has the overall authority and responsibility for site emergency response planning as well as the responsibility for the development and updating of the site Emergency Plan and coordination of this plan with other response organizations.

P.4 Review of Emergency Plan

Review and updating of the site Emergency Plan and Emergency Plan Implementing Procedures shall be certified to be current on an annual basis. Any changes identified by drills and exercises shall be incorporated into the Site Emergency Plan.

On an annual basis, the Emergency Planning Manager will provide each state and local organization responsible for off-site activation and protective action decision-making, a copy of the nuclear site procedures appropriate for their area on emergency classification and notification. A response will be requested by letter within 30 days that a review has been completed with concurrence with the EAL's used for event classification and for protective action recommendations. If problem areas are identified, the Emergency Planning Manager will ensure resolution.

P.5 Distribution of Revised Plans

The Emergency Plan and approved changes shall be forwarded to individuals and organizations listed in App. 6. Revised pages shall be dated and marked to show where changes have been made.

P.6 Supporting Plans

Figure P-1 gives a detailed listing of supporting plans to the McGuire Nuclear Site Emergency Plan.

P.7 Implementing Procedures

Written procedures will be established, implemented, and maintained covering the activities associated with emergency plan implementation. Each procedure, and changes thereto, shall be reviewed and approved by the responsible implementing manager prior to implementation and shall be reviewed periodically as set forth in administrative procedures.

McGuire Emergency Plan Implementing Procedures are listed in Figure P-2 with a reference to the section of Emergency Plan implemented by each procedure. Figure P-3 contains the distribution list for McGuire Emergency Plan Implementing Procedures.

P.8 Table of Contents

The McGuire Nuclear Site Emergency Plan contains a specific table of contents. The McGuire Nuclear Site Emergency Plan has been cross referenced to the applicable sections of NUREG-0654 Rev. 1.

P.9 Audit of Emergency Plan

The Nuclear Safety Review Board Chairman will arrange for an independent review of McGuire Nuclear Station's Emergency Preparedness Program as necessary, based on an assessment against performance indicators, and as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could adversely affect emergency preparedness, but no longer than 12 months after the change. In any case, all elements of the emergency preparedness program will be reviewed at least once every 24 months. Guidance for performing the assessment against the performance indicators is provided in the Emergency Preparedness Administrative Procedure AD-EP-ALL-0001. The independent review will be conducted by the Nuclear Oversight - Audits and will include the following plans, procedures, training programs, drills/exercises, equipment, and State/local government interfaces:

1. McGuire Nuclear Site Emergency Plan and Implementing Procedures
2. State/Local Support Agency Training Program
3. Site Training Program
4. Public and Media Training/Awareness
5. Equipment - Communications, Monitoring, Meteorological, Public Alerting
6. State/Local Plan Interface

The review findings will be submitted to the appropriate corporate and nuclear site management. Appropriate portions of the review findings will be reported to the involved federal, state, and local organizations. The corporate or nuclear site management, as appropriate, will evaluate the findings affecting their area of responsibility and ensure effective corrective actions are taken. The result of the review, along with recommendations for improvements, will be documented and retained for a period of five years.

P.10 Telephone Number Updates

Telephone numbers reflected in the online organization charts will be updated quarterly in accordance with PT/0/A/4600/091, Periodic Test of Technical Support Center Communications and Supplies.

DUKE ENERGY
MCGUIRE NUCLEAR SITE
FIGURE P-1

SUPPORTING PLANS

1. North Carolina Emergency Response Plan in support of McGuire Nuclear Site

2. South Carolina Operational Radiological Emergency Response Plan in support of Fixed Nuclear Facilities (McGuire Nuclear Site)

3. Iredell County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

4. Mecklenburg County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

5. Gaston County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

6. Lincoln County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

7. Catawba County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

8. Cabarrus County, N.C., Radiological Emergency Response Plan in Support of the McGuire Nuclear Site

9. Emergency Response Plan, Water Reactors Division, Westinghouse Electric Corporation

10. N.R.C. Region II Incident Response Plan

11. Interagency Radiological Assistance Plan - Region 3 - U.S. Department of Energy

12. INPO Emergency Response Plan

MCGUIRE

FIGURE P-2
PAGE 1 OF 4
EMERGENCY PLAN IMPLEMENTING PROCEDURES

Procedure #	Title	Emergency Plan Section Implemented
AP/0/A/5500/047	Security Events (Proprietary Info)	Section J
RP/0/A/5700/000	Classification of Emergency	Section D, E, I
RP/0/A/5700/001	Notification of Unusual Event	Section D, E, I.1, J.7
RP/0/A/5700/002	Alert	Section D, E, I.1, J.7
RP/0/A/5700/003	Site Area Emergency	Section D, E, I.1, J.7, M.1
RP/0/A/5700/004	General Emergency	Section D, E, I.1, J.7, M.1
RP/0/A/5700/006	Natural Disasters	Section D
RP/0/A/5700/007	Earthquake	Section D, H.6
RP/0/A/5700/008	Release of Toxic or Flammable Gases	Section D
RP/0/A/5700/09	Collisions/Explosions	Section D
RP/0/A/5700/010	NRC Immediate Notification	Section D
RP/0/A/5700/011	Conducting a Site Assembly, Site Evacuation or Containment Evacuation	Section E.2, J, K.7
RP/0/A/5700/012	Activation of the Technical Support Center (TSC)	Section B, H, M.1

MCGUIRE
FIGURE P-2
PAGE 2 OF 4
EMERGENCY PLAN IMPLEMENTING PROCEDURES

Procedure #	Title	Emergency Plan Section Implemented
RP/0/A/5700/018	Notifications to the State and Counties from the TSC	Section E
RP/0/A/5700/019	Core Damage Assessment	
RP/0/A/5700/020	Activation of the Operations Support Center (OSC)	Section H
RP/0/A/5700/022	Spill/Incident Response Procedure	Appendices 7, 8, 9
RP/0/A/5700/024	Recovery and Reentry	Section M
RP/0/A/5700/026	Operations/Engineering Required Actions in the Technical Support Center (TSC)	
RP/0/B/5700/023	Nuclear Communications Emergency Response Plan	Section G
RP/0/B/5700/029	Notifications to Offsite Agencies from the Control Room	Section E
HP/0/B/1009/002	Alternative Methods for Determining Dose Rate within the Reactor Building	Section D, I.6
HP/0/B/1009/003	Recovery Plan	Section M
HP/0/B/1009/006	Procedure for Quantifying High Level Gaseous Radioactivity Release During Accident Conditions	Section D, I.3

MCGUIRE
FIGURE P-2
PAGE 3 OF 4
EMERGENCY PLAN IMPLEMENTING PROCEDURES

Procedure #	Title	Emergency Plan Section Implemented
HP/0/B/1009/010	Releases of Liquid Radioactive Materials Exceeding Selected Licensee Commitments	Section D, I.3
HP/0/B/1009/021	Estimating Food Chain Doses Under Post-Accident Conditions	I.10
HP/0/B/1009/022	Accident and Emergency Response	Section I, Section E
HP/0/B/1009/023	Environmental Monitoring for Emergency Conditions	Section E, I.7, I.8, I.9
HP/0/B1009/024	Personnel Monitoring for Emergency Conditions	J.3, K.7

MCGUIRE
FIGURE P-2
PAGE 4 OF 4
EMERGENCY PLAN IMPLEMENTING PROCEDURES

Procedure #	Title	Emergency Plan Section Implemented
AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment	Section I
SH/0/B/2005/002	Protocol for the Field Monitoring Coordinator	Section I.8
SH/0/B/2005/003	Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release	J.6
SR/0/A/2000/001	Standard Procedure for Corporate Communications Response to the Emergency Operations Facility	Section G
SR/0/A/2000/003	Activation of the Emergency Operations Facility	Section B, H, M.1
SR/0/A/2000/004	Notifications to States and Counties from the EOF	Section E
EP Manual Section 1.1	Emergency Organization	Sections B, E, H
PT/0/A/4600/088	Functional Check of Emergency Vehicle and Equipment	Section H.11

FIGURE P-3
McGUIRE NUCLEAR SITE
EMERGENCY PLAN IMPLEMENTING PROCEDURES DISTRIBUTION

Control No.

2. Radiation Protection Manager
3. Emergency Planning Manager, Oconee
4. McGuire Nuclear Training
5. Operations Staff Manager
6. Site Emergency Planner, MG01EP
7. NRC Site Representative, McGuire Nuclear Site (forwarded by McGuire Emergency Planning)
8. Operator Training Director
13. Emergency Planning Manager, CNS
14. Director, Division of Radiation Protection
16. NCEM REP Program Manager
17. Tina Kuhr, Emergency Planning Consultant/NSRB Staff
19. Emergency Operations Facility, EOF Director's Area (MNS Emergency Planning, custodians)
20. McGuire Nuclear Site, Document Control
21. NCEM Western Branch Office Manager
22. NRC Document Control Desk, Washington D.C. (forwarded 1 copy by McGuire Emergency Planning)

FIGURE P-3
McGUIRE NUCLEAR SITE
EMERGENCY PLAN IMPLEMENTING PROCEDURES DISTRIBUTION

Control No.

23. NRC, Regional Administrator, Atlanta, GA (forwarded 1 copy by McGuire Emergency Planning)
24. NRC, Regional Administrator, Atlanta, GA (forwarded 1 copy by McGuire Emergency Planning)
25. NRC Office of Nuclear Materials Safety and Safeguards

§50.54(q) Screening Evaluation Form **Activity Description and References**: **BLOCK 1**

MNS Emergency Plan Section P (Accident Assessment) Rev 14-5 December 2014 Click here to enter text.

Page P-8 for Figure P-2 - Deleted any reference to HP/0/B/1009/029 and SH/0/B2005/001 and replaced with AD-EP-ALL-0202.

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites.

Planning Standards 50.47(b)(8) and 50.47(b)(9), are impacted by the new URI process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical

☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval

☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☒ §50.47(b)(8) – Emergency Facility and Equipment
☒ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination:	**BLOCK 6**
☐ The activity does involve a site specific EP commitment Record the commitment or commitment reference: _____ ☒ The activity does not involve a site specific EP commitment	
Screening Evaluation Results:	**BLOCK 7**
☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation ☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation	

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 10/22/14

50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section P (Responsibility for the Planning Effort) Rev 14-5 December 2014

BLOCK 1

Page P-8 for Figure P-2 - Deleted procedures HP/0/B/1009/029 and SH/0/B/2005/001 and replaced with AD-EP-ALL-0202.

To support a Duke Energy fleetwide initiative, replacing instructions associated with the RADDOSE dose assessment tool with Unified RASCAL Interface (URI).

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites. As a result, specific site procedures for performing dose projections are superseded by AD-EP-ALL-0202.

Additional information supporting this change:

RADDOSE is the current application used for dose assessment and projection of radiological releases during an emergency. The proposed change will replace RADDOSE with the Unified RASCAL Interface (URI) as the standard fleet-wide dose assessment tool.

RADDOSE is designed to estimate dose rates and deposition rates at 15-minute time intervals. From these estimates, integrated doses (using EPA 400-R-92-001 (EPA-400)[14] dose factors and methodologies) and total deposition are calculated for the length of time covering the release of radioisotopes.
Doses are determined at radial grid and special receptor locations in the Plume Exposure Pathway Emergency Planning Zone while deposition is calculated to fifty miles surrounding the facility, based on radiological and meteorological data collected at the plant.

The RADDOSE model is designed to provide real-time (as the release is occurring) and projected site specific predictions of atmospheric transport and diffusion as required by NUREG-0654, Revision 1, Appendix. Atmospheric transport and diffusion are performed using a variable trajectory plume simulation model along with realtime meteorological data entered either directly from the PI server or manually. Likewise, the source term component of RADDOSE uses plant specific radiological data, for a number of accident types, entered via the PI server or manually. Using this information along with EPA-400 dose conversion factors, the model determines dose rates, doses, deposition rates and total deposition.

URI is a computer code intended for use at nuclear generating stations and other emergency response facilities in the event of an actual or potential release of airborne radioactivity to the environment at levels warranting declaration of an Emergency specified in the Radiological Emergency Plan. URI is a replacement for the user interface normally delivered with the computer code Radiological Assessment System for Consequence AnaLysis ("RASCAL") maintained and distributed by the by the Nuclear Regulatory Commission (NRC).

The URI program:

- Provides a user interface specifically designed for users for nuclear power station events.
- Allows input of all required dose assessment model parameters including meteorological data, plant effluent monitor data, and plant condition and status.

- Develops source terms based on user input.
- Creates RASCAL data files based on the specific user input
- Invokes the RASCAL met data processor, plume model processor, and puff model processors.
- Reads and interprets RASCAL results files and provide reports to the user of doses, affected areas, and other information relevant to emergency plan implementation.

The code has three modes: Rapid Assessment, Detailed Assessment, and Sum Assessment. Rapid Assessment enables on-shift staff to meet regulatory requirements for quick, simplified dose assessments in the initial phases of an event. Detailed Assessment enables the Emergency Response Organization staff to make more detailed dose assessments. Sum Assessment adds multiple concurrent assessment results.

Because certain aspects of the interface must be site or unit specific, particularly the release pathways, separate programs are used for each unit, or when possible, multi-unit site if the units are identical. The majority of the code forms and modules are common to all these separate programs, with the pathways and site specific setup parameters different for each site / unit.

The program utilizes two types of data:

- User inputs
- Constants stored in external encrypted xml format files unique to each site.

User inputs are values needed to run dose assessments that vary from assessment to assessment. These would consist of items such as meteorological data and effluent monitor readings.

Constants are values set internally by the system administrators. These would consist of items such as site boundary distances and monitor response factors that define the site and do not change for each assessment. A separate computer program called "Interface Maintenance" is used to control and generate these constants and maintain the SQL data table files that these constants are stored in. The URI computer programs cannot change constant values or their related encrypted xml files.

The dose assessment computer programs will only be run when a user needs to perform a dose assessment. The code does not generate any data that needs to be retained by the program after an assessment is completed, though reports can be printed or saved to individual files for later retrieval if required.

There are no interfaces with plant safety systems.

The URI programs are specifically designed to interface with versions 4.0 to 4.2 of the NRC computer program RASCAL. It is expected that future revisions will remain compatible but would need to be verified for each new RASCAL release. RASCAL is designed to produce emergency release dose assessments. RASCAL communicates between its own separate modules (.exe and .dll modules) using ASCII text data files. The URI programs interface with RASCAL by creating the same data files in the same format based on the information stored in the xml data tables and the user input. These RASCAL data files are modified or retrieved 'on-the-fly' for each assessment performed.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☒ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

R39/25/14

Impact and Licensing Basis Determination: **BLOCK 3**

10 CFR 50.47(b)(8) states: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained."

The emergency planning functions associated with 10 CFR 50.47(b)(8) state:

- Adequate facilities are maintained to support emergency response.
- Adequate equipment is maintained to support emergency response.

The applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E states (in part): Adequate provisions shall be made and described for emergency facilities and equipment, including:
2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.H.8 states:

Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.

10 CFR 50.47(b)(9) states: "Adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use."

The emergency planning function associated with 10 CFR 50.47(b)(9) states:

- Methods, systems and equipment for assessment of radioactive releases are in use.

The applicable supporting requirements which are described in 10 CFR 50, Appendix E state:

Section IV.B (in part):

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described,

Section IV.E (in part):

Adequate provisions shall be made and described for emergency facilities and equipment, including:

2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.I states (in part):

8. Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment and estimated deployment times.

9. Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} uCi/cc (microcuries per cubic centimeter) under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detected activity.

The applicable informing criteria described in NUREG-0696, Section 4.8 states (in part):

The EOF technical data system will receive, store, process and display information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data providing information...

The EOF data set shall include radiological, meteorological, and other environmental data needed to:

- Assess environmental conditions,
- Coordinate radiological monitoring activities, and
- Recommend implementation of offsite emergency plans.

Licensing Basis:

This evaluation included a search of MNS licensing basis documents for references to Dose Assessment, and

specifically for references to RADDOSE-V. The search concluded that while the dose assessment function is discussed, specific references to the dose assessment tool and how to perform dose assessments are not discussed. As a result, the MNS licensing basis is not impacted by the change to replace RADDOSE-V with URI as the dose assessment tool. The change is which supports replacement of RADDOSE V with URI and is strictly administrative and does not affect the licensing basis.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

The replacement of RADDOSE with URI will continue to comply with applicable regulations and commitments by providing a means of assessing offsite radiation dose during an emergency.

Compliance with the requirements identified above is maintained in the following manner:

Item 1

URI uses plant effluent monitor values and meteorological instrumentation input for the calculation of dose assessment results. These results are then used to determine the environmental impact of radioactive material releases and to direct the activities of field monitoring teams in plume tracking. Licensee emergency response personnel also use the assessment results to make protective action recommendations to state and local authorities. These features of URI are consistent with the current capabilities of RADDOSE.

RADDOSE employs an automatic data download from selected meteorological and radiation monitoring instrumentation to make dose projections. Typically, these downloads occur at 15-minute intervals. The user performing the assessment is responsible for validating the downloaded information against current plant conditions. While URI has no provision for automatic data downloading, it does allow the user to "drag and drop" meteorological and radiation parameters into the fields used by the application. This does not result in a significant delay since most of the time spent for data input in both RADDOSE and URI is for data validation. Field syntax restrictions reject out-of-range data to prevent erroneous information from being used in projection calculations. This feature, coupled with continual validation by the user, minimizes the risk of incorrect data entry.

Item 2

The portion of this requirement pertinent to the proposed change is that the licensee provide the method to perform rapid radiological assessments.

RADDOSE uses a Gaussian dispersion model and employs dose conversion factors taken from EPA 400, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*. URI uses a similar model with the same dose conversion factors. Empirical comparisons of both applications yield similar dose projection results when subjected to the same radiological and meteorological conditions. Calculation time of both applications is approximately the same. In addition, RASCAL (the underlying calculational base of URI) is sanctioned by the NRC and accepted as an industry standard application for dose projection.

Item 3

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of how offsite dose projections are made. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

Item 4

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of the equipment used for assessing the impact of the release of radioactive materials to the environment. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

The replacement of the Raddose-V dose assessment tool with URI involved rigorous testing and walkdowns to ensure the tool was ready for implementation. Duke Energy and the URI vendor performed a Validation and

Verification of the program to support implementation of the change. In addition, MNS ERO members qualified in dose projections received training on the changes and differences in dose projection methodology between RADDOSE-V and URI. This change to replace Raddose-V with URI does not change intent. This change supports the Duke Energy fleetwide initiative to replace the dose projection tool used for dose assessment and for protective action decision-making at all nuclear sites with an enhanced and improved methodology. The fleet procedure AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment" will now provide MNS dose assessment personnel with instructions for performing dose projections at the MNS site. The implementation of AD-EP-ALL-0202 ensures the correct software program for performing dose projections is used. This change continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

The change which supports the replacement of Raddose-V with URI is strictly administrative and continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:

The screening of the change from Raddose-V to URI identified two affected emergency planning functions associated with 10 CFR 50.47(b)(8) and 10 CFR 50.47(b)(9), as described above in the Impact and Licensing Basis Determination.

The change replaces RADDOSE with URI as the principal dose assessment tool. While the user interface for URI differs from that of RADDOSE, the assessment methodologies of both applications are essentially the same. Both employ the same dose conversion factors for determining source term dose. Both applications also use similar meteorological models of Gaussian plume dispersion.

URI provides a site specific overlay on the existing RASCAL meteorological, dispersion, and dose assessment models for all required input for emergency dose assessment as well as reports and plume graphics. Using the URI interface, the user does not interact with any part of the original RASCAL input or output screens.

Three of the primary purposes of URI are to make an interface that includes significant additional site specific processes (e.g. site specific effluent monitors), to simplify the input process for the user, and to use an industry common dose assessment model.

URI operates by providing a single input / result display form with non-serial input, and uses a 'pathway' release condition process rather than requiring the user to answer repetitive questions about the release. By selecting a 'pathway', options are set including default meteorological towers, release heights, applicable effluent monitors, etc. to limit the number of sequential questions the user must answer and to prevent selections that do not match. While all emergency effluent dose assessment systems require similar information (met data, isotopic mix, release magnitude), URI minimizes the effort required and significantly limits the opportunity for inappropriate selections. Options selections are defined for each specific pathway, which both prevent inappropriate selections and highlight to the user the available options for defining the engineered active and passive particulate and iodine removal processes that affect the mix appropriate for the selected pathway.

Numerous additional reports, data displays, etc. are provided for details when needed. Plume plots are provided, and a graphical display of areas exceeding the protective action guideline (PAG) limit is available. The PAG graphic can be based on either the standard 16 sectors and 3 distances or on geo-political emergency response areas.

One distinction between RADDOSE and URI deals with the identification of protective action recommendations (PARs). A feature of RADDOSE automatically flags the user when a dose projection determines that a PAR

threshold has been met. The user is then expected to refer to approved procedures to confirm the validity of this indication. Experience has shown that the automatic feature can be misleading under certain conditions and has led to incorrect PAR recommendations, particularly when the dose projection was performed by a less experienced user.

URI does not have this automatic flagging feature. PAR determination is made solely on approved procedural guidance without reliance on a potentially misleading indication.

Multiple options for source term basis are provided including monitored with single channel effluent monitors, monitored with multi-channel group monitors, or release point samples, and numerous unmonitored options including containment high radiation monitors, containment leakrate without monitors, RCS leakrate, or field team back calculation.

Three assessment methods are provided; a "Detailed" option for more experienced users, a "Rapid" option that makes more fundamental assumptions that is intended for immediate on-shift response, and a "Summation" option that allows for adding multiple concurrent releases. While the "Detailed" and "Rapid" options are consistent with current RASCAL assessment modes, the "Summation" option is an enhancement resulting from Fukushima experience.

The URI application, using site-specific inputs, has been evaluated against the software quality assurance criteria of NSD-800. Comparison of test cases for RADDOSE and URI show consistently satisfactory results. The two applications showed no significant difference in the timeliness or accuracy of dose assessment information.

In summary, URI is characterized by:

- a user-friendly input interface,
- graphical overlays displaying projected plume paths and dose values,
- the ability to perform dose projections using multiple simultaneous releases, and
- wide acceptance by both the industry and the NRC as an effective dose assessment application.

The change does not result in a reduction in effectiveness of facilities, response organizations, or response equipment. This change is strictly administrative and does not change intent. This change supports the replacement of the RADDOSE dose assessment tool with Unified RASCAL Interface (URI). This change does not affect the timeliness, accuracy or capability to determine or process dose projections and supports a fleetwide initiative to align dose assessment tools at all Duke Energy nuclear plant sites.

This change does not affect the emergency planning functions associated with 10 CFR 50.47(b)(8), because this change continues to ensure that adequate facilities and equipment are maintained at MNS to support emergency response, including equipment used for performing dose projections. This change does not affect the applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E, because this change continues to ensure that adequate provisions shall be made and described for emergency facilities and equipment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.H.8.

This change does not affect the emergency planning function associated with 10 CFR 50.47(b)(9), because the change continues to ensure that methods, systems, and equipment for assessment of radioactive releases are in use at MNS. This change does not affect the applicable supporting requirement described in 10 CFR 50, Appendix E.IV.B and E, because this change continues to ensure that equipment is available for determining magnitude and assessment of releases to the environment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.I (8-9) and NUREG-0696, Section 4.8.

As stated above, this change does not reduce the effectiveness of the MNS Emergency Plan. Instead, the change described in this revision continues to provide additional assurance that the ERO has the ability and capability to:

- respond to an emergency;
- perform functions in a timely manner;

- effectively identify and take measures to ensure protection of the public health and safety; and
- effectively use response equipment and emergency response procedures.

This change enhances ERO readiness to support a classified emergency, resulting in an improved capability to ensure health and safety of plant personnel and the general public. This change continues to meet NRC requirements, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

This change is an overall improvement to the MNS Emergency Preparedness Program.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 10/22/14
Approver Name: Kevin L. Murray	Approver Signature	Date: 11-11-14

DUKE ENERGY
MCGUIRE NUCLEAR SITE

APPENDIX INDEX

APPENDIX 1

1.0 DEFINITIONS

AFFECTED PERSONS
Persons who have received radiation exposure or have been physically injured as a result of an accident to a degree requiring special attention as individuals, e.g., decontamination, first aid or medical services.

ANNUAL
For periodic emergency planning requirements, annual is defined as twelve months, with a maximum interval of 456 days.

ASSESSMENT ACTION
Those actions taken during or after an accident to obtain and process information that is necessary to make decisions to implement specific emergency measures.

BIENNIAL
For periodic emergency planning requirements, biennial is defined as at least once every two years, with a maximum interval of 912 days. (Note that this does not apply to the scheduling of biennial exercises. An exercise can occur at any time during the second calendar year after the previous exercise.)

CORRECTIVE ACTIONS
Emergency measures taken to ameliorate or terminate an emergency situation at or near the source of the problem to prevent an uncontrolled release of radioactive material or to reduce the magnitude of the release, e.g., shutting down equipment, fire-fighting, repair and damage control.

DEGRADING

- Plant parameters (ex. temperature, pressure, level, voltage, frequency) are trending unfavorably away from expected or desired values **AND** plant conditions could result in a higher classification or Protective Action Recommendation (PAR) before the next follow-up notification.

- Site conditions (ex. wind, ice/snow, ground tremors, hazardous/toxic/radioactive material leak, fire, security event) impacting plant operations or personnel safety are worsening **AND** plant conditions could result in a higher classification or Protective Action Recommendation (PAR) before the next follow-up notification.

DRILL
A drill is a supervised instruction period aimed at testing, developing, and maintaining skills in a particular operation.

EMERGENCY ACTION LEVELS (EAL's)
A pre-determined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class. An EAL can be: an instrument reading; an equipment status indicator; a measurable parameter (onsite or offsite); a discrete, or another phenomenon which, if it occurs, indicates entry into a particular emergency class.

EMERGENCY OPERATIONS FACILITY (EOF)
The Emergency Operations Facility is the facility utilized for direction and control of all emergency and recovery activities with emphasis on the coordination of off-site activities such as dispatching mobile emergency monitoring teams, communications with local, state and federal agencies, and coordination of corporate and other outside support.

EMERGENCY PLANNING ZONE (EPZ)
The area for which planning is needed to assure that prompt and effective actions can be taken to protect the public in the event of an accident. The plume exposure EPZ is about 10 miles in radius and the ingestion exposure EPZ is about 50 miles in radius.

EXCLUSION AREA
The nuclear site property out to a radius of 2500 feet, that meets the 10CFR100 definition.

EXERCISE
An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations.

IMPROVING

- Plant parameters (ex. temperature, pressure, level, voltage, frequency) are trending favorably toward expected or desired values **AND** plant conditions could result in a lower classification or emergency termination before the next follow-up notification.

- Site conditions (ex. wind, ice/snow, ground tremors, hazardous/toxic/radioactive material leak, fire, security event) have become less of a threat to plant operations or personnel safety **AND** plant conditions could result in a lower classification or emergency termination before the next follow-up notification.

INGESTION EXPOSURE PATHWAY
The principle exposure from this pathway would be from ingestion of contaminated water or foods such as milk or fresh vegetables. The time of potential exposure could range in length from hours to months.

MONTHLY
For periodic emergency planning requirements, monthly is defined as once each month, with a maximum interval of 38 days.

OPERATIONAL SUPPORT CENTER (OSC)
In the event of an emergency, shift support personnel (e.g., auxiliary operators and technicians) other than those required and allowed in the control room shall report to this center for further orders and assignment.

PLUME EXPOSURE PATHWAY
The principle exposure sources from this pathway are (a) external exposure to gamma radiation from the plume and from deposited material and (b) inhalation exposure from the passing radioactive plume. The time of potential exposure could range from hours to days.

POPULATION-AT-RISK
Those persons for whom protective actions are being or would be taken.

PROTECTED AREA
An area encompassed by physical barriers and to which access is controlled.

PROTECTIVE ACTIONS
Those emergency measures taken after an uncontrolled release of radioactive materials has occurred, for the purpose of preventing or minimizing radiological exposures to persons that would be likely to occur if the actions were not taken.

PROTECTIVE ACTION GUIDES (PAG)
Projected radiological dose or dose-commitment values to individuals in the general population that warrant protective action following a release of radioactive material. Protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the preventive action is not offset by excessive risks to individual safety in taking the protective action. The PAG does not include the dose that has unavoidably occurred prior to the assessment.

QUARTERLY
For periodic emergency planning requirements, quarterly is defined as once every three months, with a maximum interval of 112 days.

RECOVERY ACTIONS
Those actions taken after the emergency to restore affected property as nearly as practicable to its pre-emergency condition.

SEMI-ANNUAL
For periodic emergency planning requirements, semi-annual is defined as once every 6 months, with a maximum interval of 228 days.

SITE
That part of the nuclear site property consisting of the Reactor, Auxiliary, Turbine, Service Buildings and grounds, contained within the outer security area fence.

STABLE
Plant conditions are neither degrading nor improving.

TECHNICAL SUPPORT CENTER (TSC)
This on-site center is for use by plant management, technical and engineering support personnel. In an emergency, this center shall be used for assessment of plant status and potential off-site impact in support of the control room command and control function.

TRIENNIAL
For periodic emergency planning requirements, triennial is defined as at least once every three years, with maximum interval of 1369 days.

VITAL AREA
Areas within the Protected Area that house equipment important for nuclear safety. Access to a Vital Area is allowed only if an individual has been authorized to be in that area per the Security plan, therefore Vital Area is a Security term.

WEEKLY
For periodic emergency planning requirements, weekly is defined as once every 7 days, with a maximum interval of 9 days.

APPENDIX 2
MCGUIRE NUCLEAR SITE
METEOROLOGICAL PROGRAM

INTRODUCTION

The meteorological program described in this appendix was developed using guidance provided by NUREG-0654, Revision 1, Regulatory Guide 1.23, Proposed Revision 1, Regulatory Guide 1.111, Revision 1, and Regulatory Guide 1.109.

EFFLUENT DISPERSION MODEL

A computer model which simulates the transport and diffusion of released effluents is a puff-advection model which incorporates a horizontal wind field that can vary in time but is consistent in space. It is assumed in the puff-type model that the spread within a puff along the direction of flow is equal to the spread in the lateral direction (i.e., horizontal Gaussian Symmetry). In the model, concentration averages are obtained by summing concentrations of individual elements for the grid points over which the puffs pass. Features incorporated into the model include the use of primary, backup and predicted data, building wake effects and an assumed ground release mode. Appropriate persistence would be used for initial releases until a meteorologist is notified to provide predictive data.

INSTRUMENTATION

Figure 2-1 shows the type and number of parameters measured at McGuire Nuclear Site. The meteorological conditions present at McGuire Nuclear Site warrant the use of the basic described meteorological variables. These include wind speed and wind direction measured at high and low levels, delta-temperature and sigma theta for stability classification, ambient air and dew point temperature and precipitation.

DATA HANDLING

Meteorological data for dose calculation consists of a primary digital recording/storage system and a secondary analog chart recording system both of which meet system accuracies and other specifications as suggested in Regulatory Guide 1.23, Proposed Revision 1. In the digital system meteorological variables are sampled at varying time (1-60 seconds) intervals from which 15 minute total, average and/or standard deviation quantities are computed. Digital data is placed on an external PI server accessible to computers that are used for emergency effluent dispersion modeling and dose calculation. The chart recording system is maintained as a backup to the digital system.

DOSE ASSESSMENT METHODOLOGY

Dose assessment is calculated through a dose projection computer model Unified RASCAL Interface (URI). The model provides for the assessment of off-site radiological doses and accommodates both real time and forecast modes in the calculation of exposures to the general public. The model provides results of the sum of the effective dose equivalent from external radiation (both plume and ground deposition) and the committed effective dose equivalent from the inhalation of radioisotopes (the sum of both factors equaling the total effective dose equivalent of TEDE), and the committed dose equivalent to the thyroid (CDE thyroid). Dose conversion factors are derived from Regulatory Guide 1.109.

The model uses source term (amount of radioactivity in the unit vent, containment and containment leakage or steam release valves), flow rates and real time meteorology to calculate doses. Unit vent grab sample analyses or unit vent radiation monitor readings are used to determine concentrations of radioactivity within the unit vent source term. Containment atmosphere samples, containment process radiation monitors or containment high range radiation monitors are used to determine concentrations within the containment source term. The containment design leak rate is used unless factors, such as containment pressure, indicate that another value is more realistic. Equivalent concentrations from a steam release are calculated by using known or assumed steam mass release rates and the specific steam line radiation monitor reading.

PHYSICAL SYSTEM DESCRIPTION

Continuous parallel signals enter each Operator Aid Computer (OAC) and the analog recorders. The OAC calculates end to end 15 minute quantities, starting on the hour, for all meteorological variables (except sigma theta) with a sampling interval of 60 seconds. It calculates a 15 minute average for high and low level wind direction and speed; 15 minute averages are also calculated for delta-temperature, ambient temperature and dew point temperature. Total water equivalence is computed for precipitation. Sigma theta is calculated by a field unit with a sampling interval of one second again for end to end 15 minute periods starting on the hour, and then is fed to each OAC. All quantities are stored on the OAC with a minimum recall of 12 hours. This data is transferred to the MNS PI Server. Data stored on the PI server is accessible to computers which are used for emergency effluent dispersion modeling and dose calculation

DETAILED DESCRIPTION OF SUBSYSTEMS

Sensors to Operator Aid Computer

Lightning protection is provided for all sensors and signal conditioning equipment; wind sensors are outfitted with heating jackets, when necessary, for protection against icing conditions. Signal conditioners and the sigma theta field unit are housed in an environmentally controlled building at the base of the high level tower. Signal cables to the OACs and analog recorders are shielded to minimize electrical interference.

Operator Aid Computer (OAC) to MNS PI Server

The process computer OAC system which is utilized for data storage consists of SAIC, HP and RTP equipment. Each unit OAC is a backup for the other, capable of supplying the same required meteorological values. The data is transferred to the MNS PI server which is the server used for long-term data storage and retrieval. Plant data on the PI server is accessible to computers that are used for emergency effluent dispersion modeling and dose calculation.

QUALITY ASSURANCE

Meteorological components have been designed, procured and installed as a non-safety related system. Equipment has been purchased from suppliers which have provided high quality, reliable products in the past. Surveillance during construction was provided as for any other non-safety system.

FIGURE 2-1

MCGUIRE NUCLEAR SITE
METEOROLOGICAL PARAMETERS OF THE UPGRADED SYSTEM

Measurement System	Existing high level and 10 meter tower	High level wind speed and direction Low level wind speed and direction Delta-temperature Low level sigma theta Dry bulb temperature Dew point Precipitation

APPENDIX 3

DUKE ENERGY
MCGUIRE NUCLEAR SITE
ALERT AND NOTIFICATION SYSTEM DESCRIPTION

GENERAL DESCRIPTION

The Alert and Notification System for McGuire Nuclear Site consists of an acoustic alerting signal and notification of the public by commercial broadcast (EAS). The system is designed to meet the acceptance criteria of Section B of Appendix 3, NUREG-0654, FEMA-REP-1, Rev. 1.

The Emergency plans of Duke Energy, the State of North Carolina, and the counties of Mecklenburg, Gaston, Catawba, Lincoln, and Iredell include the organizations and individuals, by title, who will be responsible for decision-making as regards the alert and notification system. The county locations from which the sirens would be activated and, potentially, the request for an EAS message would come are manned 24 hours per day. Each organization's plan describes provisions for use of public communications media or other emergency instructions to members of the public. The plans of the state of North Carolina include a description of the information that would be communicated to the public under given circumstances.

A. Concept of Operations

A system of 67 fixed sirens is installed and operational in the 10-mile EPZ around McGuire Nuclear Site. A backup means of alerting and notification is described in the State and County Plans. This backup method includes area-wide emergency service vehicles traversing the area and giving both an alerting signal and notification message.

Each county will control the activation of the sirens within its boundaries (except for Catawba County - their one siren will be activated by Lincoln County). However, Mecklenburg, as the lead county, has the ability to activate all EPZ sirens from its control point.

B. Criteria for Acceptance

The alert and notification system for the McGuire Nuclear Site provides an alerting signal and an informational or instructional message to the population (via the EAS) on an area-wide basis throughout the 10-mile EPZ within 15 minutes from the time the cognizant off-site agencies have determined the need for such alerting exists. The emergency plans for the state of North Carolina (Annex E) include evidence of EAS preparation for emergency situations and the means for activating the system.

C. Physical Implementation

1. The activation of this alert and notification system requires procedures and relationships between both Duke Energy and the off-site agencies that support Duke and McGuire Nuclear Site. When an incident is determined to have reached the level requiring public protective actions, Duke contacts the cognizant off-site agency via DEMNET and provides its recommendations. This system is available for use 24 hours per day and links the Control Room, TSC, EOF, SERT headquarters, the county warning points, and the county EOC's.

2. The expected performance of the sirens used in this system is described in Figure Q-1. These sirens complement existing alerting systems. The ambient background sound level in the McGuire area is taken to be 50 db for areas of "less than 2000 persons/per square mile" and 60 db for areas above this density. On this basis, the siren coverages are designed to provide a signal 10db above the average daytime ambient background.

   Furthermore, the sirens have been located to assure that the maximum sound levels received by any member of the public should be lower than 126 db.

   The basis for selection of the 60 db(c) and 70 db(c) criteria is documented as follows:

   Location of heavy industry - There is no "heavy industry" in the McGuire 10 mile EPZ.

   Attenuation factors with distance - 10 db loss per distance doubled (See Figure Q-1)

   Siren output db(c) at 100 ft. vs. assumed range and acoustic frequency spectra -
   2001-AC: 126± 1.0 db at 100 feet
   Assumed ranges per Figure Q-1, 10 db loss column

   Frequency Spectra:
   2001-AC: top frequency 750 Hz

   Map showing siren location - See Figure Q-2

   Mounting height of sirens - 50 feet (approximate)

   Special weather condition considerations (such as expected heavy snow) - None

   The siren system will produce a 3 minute steady signal and is capable of repetition.

Test Program

Periodic testing of the sirens is performed as follows:

Test	Req'd By	Min. Req'd Freq.	Norm. Freq. Perf. By Duke
Silent Test	FEMA-REP-10,NUREG-0654 Rev. 1, App. 3	Every two weeks.	Normally performed weekly on Thursdays.
Full Cycle Test (called full-scale test by FEMA)	FEMA-REP-10, NUREG-0654 Rev. 1, App. 3	Annually.	Normally performed on the second Wednesday of each quarter, or during the biennial exercise. See Note 1 below.
Growl Test	FEMA-REP-10, NUREG-0654 Rev. 1, App. 3, FEMA CPG 1-17 March 1, 1980 {PIP-G-00-0135}	Quarterly and after PM is performed.	See NOTE 1 below for quarterly test. See NOTE 3 below for growl test following PM.

NOTE:

1. Quarterly full cycle tests fulfill/exceed the requirements for quarterly growl tests.
2. Each site may elect to perform some method of feedback system verification during the full cycle siren test.
3. For the FEMA CPG 1-17 growl test following PM, the siren chopper is sounded for a short period of time so that it never produces full sound output. {PIP G-00-0135}

Refer to FAM Section 3.3 for a detailed narrative of the siren test program.

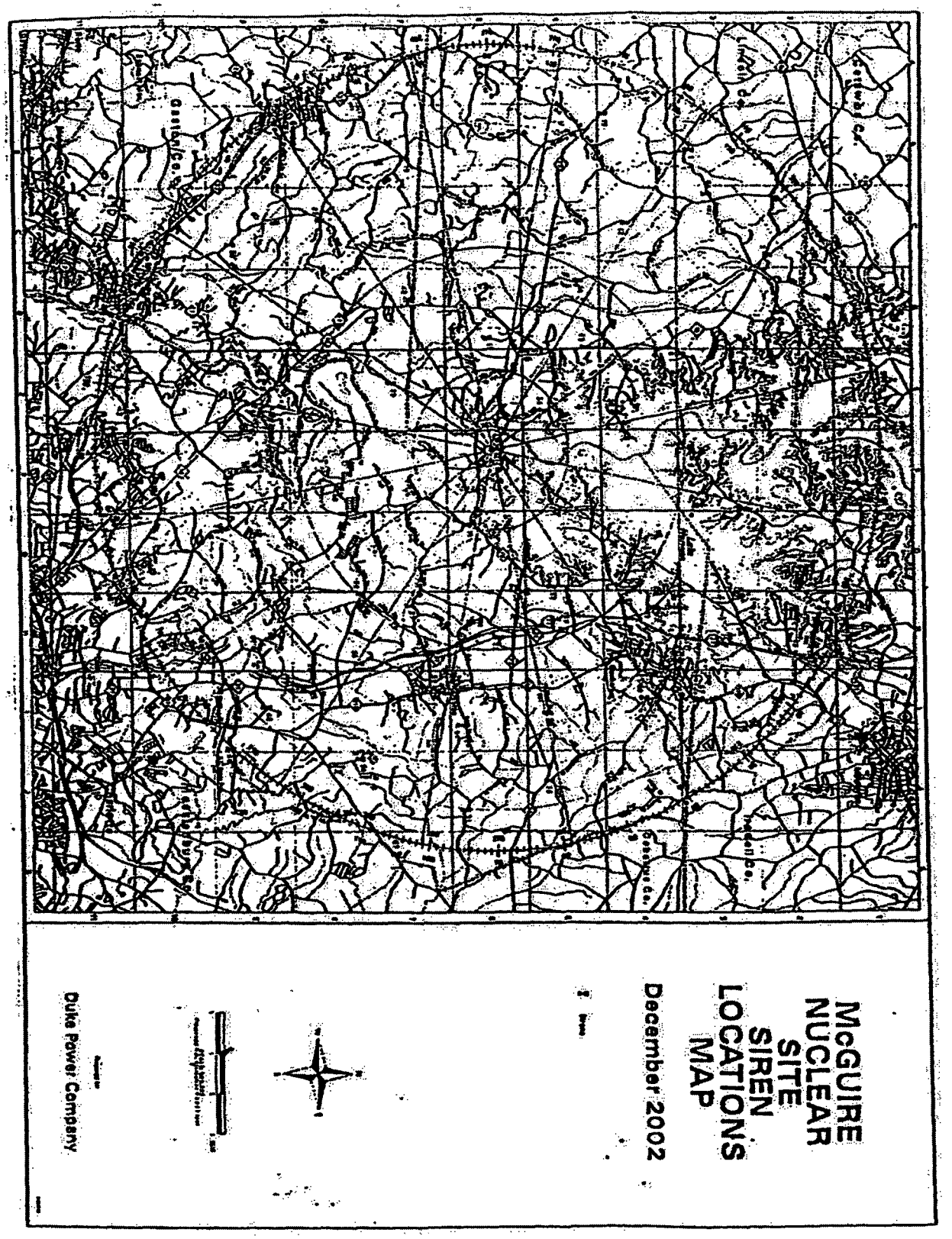
FIGURE Q-1

SIREN RANGE IN FEET

12 AND 10 dB LOSS PER DISTANCE DOUBLED

MINIMUM LEVEL COVERAGE IN dB	2001AC 126dB(c)SIREN 12	10
85	1125	1830
80	1500	2600
75	2000	3680
73	2260	4210
70	2700	5200
68	3000	6000
65	3600	7400
60	4800	10400

FIGURE Q-2
SIREN LOCATIONS



APPENDIX 4

DUKE ENERGY
MCGUIRE NUCLEAR SITE
EVACUATION TIME ESTIMATES
DECEMBER 2012

The evacuation time estimates described in part J of this plan were prepared for McGuire by KLD Engineering, P.C. Report KLDTR-501, MNS, development of Evacuation Time Estimates, revision 1. See MNS-ETE-12132012-000, MNS Evacuation time Estimates (ETE) dated December 2012.

The purpose of the study was to update the permanent resident population count for the EPZ around McGuire Nuclear Site due to population growth.

The ETE Report has been made available to site, state, and local planners for their use.

Six scenarios were chosen to be studied and ETE listed is for entire EPZ:

1. Winter weekday, fair weather conditions. Estimated evacuation time is 4 hours 35 minutes.

2. Winter weeknight, fair weather conditions. Estimated evacuation time is 3 hours 10 minutes.

3. Summer weekend, fair weather conditions. Estimated evacuation time is 3 hours 30 minutes.

4. Winter weekday, adverse weather conditions. Estimated evacuation time is 5 hours 40 minutes.

5. Winter weekend, adverse weather conditions. Estimated evacuation time is 4 hours 10 minutes.

6. Summer weekend, adverse weather conditions. Estimated evacuation time is 3 hours 55 minutes.

The evacuation study is available in the MNS Emergency Planning office for study and review.

APPENDIX 5
AGREEMENT LETTERS

The following agreement letters support the McGuire Nuclear Site Emergency Plan and are attached:

1. Carolinas Medical Center
2. Huntersville Fire Department
3. Cornelius Volunteer Fire Department
4. Mecklenburg County Fire Marshall
5. North Mecklenburg Rescue Squad (DELETED)
6. Mecklenburg Emergency Medical Services Agency (MEDIC)
7. Charlotte-Mecklenburg Emergency Management Office
8. Iredell County Civil Preparedness Agency
9. Lincoln County Department of Emergency Management
10. Gaston County Department of Emergency Management
11. Catawba County Department of Emergency Management
12. Cabarrus County Department of Emergency Management
13. REACTS
14. DOE - Savannah River
15. INPO
16. North Carolina
17. Letter Documenting Duke Energy Assumptions for Offsite Dose Calculation Methodology
18. Duke Energy Back-Up TLD Reader
19. Joint Information Center
20. Alternate Site Agreement
21. G & G Metal Fabrication (Hale pump repair vendor)
22. Duke's Lincoln Combustion Turbine Facility operating agreement with MNS/CNS/ONS on emergency supply of diesel fuel.
23. Charlotte Mecklenburg Police Department (CMPD)

These Letters of Agreement are updated as necessary and at least every (3) years to ensure adequate awareness on the part of all concerned of the existence and commitment to provide agreed services or assistance.

APPENDIX 6

MCGUIRE NUCLEAR SITE
EMERGENCY PLAN DISTRIBUTION

NAME

McGuire Nuclear Site
Document Control, MG05DM
Site Emergency Planner, MG01EP
Site Emergency Planner (TSC), MG01EP
Control Room, MG01OP
Operator Training Director, MG03OT
Operations Staff Manager, MG01OP
Operations Shift Manager, MG01OP
Radiation Protection Manager, MG01RP
Satellite File, MG01S1
Environmental Management, MG01EM
Regulatory Compliance, MG01RC

EOF Director's Area
McGuire Emergency Planning, MG01EP

NRC
McGuire NRC Resident Inspector, MG01A
NRC Regional Administrator (copy forwarded by Emer. Plan)
NRC Regional Administrator (copy forwarded by Emer. Plan)
NRC Document Control (copy forwarded by Emer. Plan)
NRC Office Of Nuclear Material Safety and Safeguards

Emergency Planning Consultant/NSRB Staff
E. M. Kuhr, EC05P

News Group
Emergency Planning Consultant, EC12X

Catawba Nuclear Site
CNS Emergency Planning Manager, CN01EP

North Carolina
Director, Division of Environmental Health, Radiation Protection Section, Raleigh, NC
NCEM REP Program Manager, Raleigh, NC
NCEM Western Branch Office Manager, Conover, NC

Cabarrus County
Coordinator, Cabarrus County Dept. of Emergency Mgmt., Concord, NC

APPENDIX 6

MCGUIRE NUCLEAR SITE
EMERGENCY PLAN DISTRIBUTION

Catawba County
Catawba County Emergency Management Coordinator, Newton, NC

Gaston County
Coordinator, Gaston County Dept. of Emergency Mgmt., Gastonia, NC

Iredell County
Coordinator, Iredell County Civil Preparedness Agency, Statesville, NC

Lincoln County
Director, Lincoln County Emergency Services, Lincolnton, NC

Mecklenburg County
Director, Charlotte-Mecklenburg Emergency Mgmt. Office, Charlotte, NC

Oconee Nuclear Site
ONS Emergency Planning Manager, ON03EP

APPENDIX 6

MCGUIRE NUCLEAR SITE
EMERGENCY PLAN DISTRIBUTION

(ADDRESSES)

Director
Division of Environmental Health
Radiation Protection Section
1645 Mail Service Center
Raleigh, NC 27699-1645

REP Program Manager
NC Division of Emergency Management
4713 Mail Service Center
Raleigh, NC 27699-4713

Western Branch Office Manager
NC Division of Emergency Management
3305-15 16th Ave. S.E.
Suite 305
Conover, NC 28613-9213

Coordinator
Cabarrus County Department of Emergency Management
P.O. Box 707
Concord, NC 28026-0707

Michael F Weber, Director
Office of Nuclear Material Safety and Safeguards
Mail Stop T-8A23
Washington DC, 20555-0001

(ADDRESSES Continued)

Emergency Management Coordinator
Catawba County Administration Building
100-A South West Boulevard
Post Office Box 389
Newton, NC 28658-0389

Coordinator
Gaston County Department of Emergency Management
Post Office Box 1578
1615 North Highland Street
Gastonia, NC 28052

Coordinator
Iredell County Civil Preparedness Agency
Post Office Box 788
Statesville, NC 28677

Director
Lincoln County Emergency Services
115 W. Main Street
Lincolnton, NC 28092

Director
Mecklenburg Emergency Management
228 East 9th Street
Charlotte, NC 28202-2852

§50.54(q) Screening Evaluation Form **Activity Description and References:** **BLOCK 1**

MNS Emergency Plan Section Q (Appendix 2, Meteorological System Description) Rev 14-5 December 2014 Click here to enter text.

Page Q-6 - Changed "RADDOSE" to "Unified RASCAL Interface (URI)".

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites.

Planning Standards 50.47(b)(8) and 50.47(b)(9), are impacted by the new URI process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical
☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval
☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☒ §50.47(b)(8) – Emergency Facility and Equipment
☒ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination:	**BLOCK 6**
☐ The activity does involve a site specific EP commitment Record the commitment or commitment reference: _____ ☒ The activity does not involve a site specific EP commitment	

Screening Evaluation Results:	**BLOCK 7**
☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation ☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation	

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Mark Mulkey	Reviewer Signature	Date: 10/22/14

50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan Section Q (Appendix 2 (Meteorological System Description)) Rev 14-5 December 2014

BLOCK 1

Page Q-6 for Appendix 2 (Meteorological System Description) for "Dose Assessment Methodology"- replaced RADDOSE with the Unified RASCAL Interface (URI).

To support a Duke Energy fleetwide initiative, replacing instructions associated with the RADDOSE dose assessment tool with Unified RASCAL Interface (URI).

This change supports a fleetwide initiative to replace the dose assessment tools that are currently in place at the Duke Energy Carolinas sites (using RADDOSE-V) and the Duke Energy Progress sites (using RASCAL) with Unified RASCAL Interface (URI) in order to align dose assessment tools at all Duke Energy nuclear plant sites. A new fleet procedure AD-EP-ALL-0202, Emergency Response Dose Assessment, has been developed which provides instructions for performing dose projections using Unified RASCAL Interface (URI) at MNS and the other nuclear plant sites. As a result, specific site procedures for performing dose projections are superseded by AD-EP-ALL-0202.

Additional information supporting this change:

RADDOSE is the current application used for dose assessment and projection of radiological releases during an emergency. The proposed change will replace RADDOSE with the Unified RASCAL Interface (URI) as the standard fleet-wide dose assessment tool.

RADDOSE is designed to estimate dose rates and deposition rates at 15-minute time intervals. From these estimates, integrated doses (using EPA 400-R-92-001 (EPA-400)[14] dose factors and methodologies) and total deposition are calculated for the length of time covering the release of radioisotopes.
Doses are determined at radial grid and special receptor locations in the Plume Exposure Pathway Emergency Planning Zone while deposition is calculated to fifty miles surrounding the facility, based on radiological and meteorological data collected at the plant.

The RADDOSE model is designed to provide real-time (as the release is occurring) and projected site specific predictions of atmospheric transport and diffusion as required by NUREG-0654, Revision 1, Appendix. Atmospheric transport and diffusion are performed using a variable trajectory plume simulation model along with realtime meteorological data entered either directly from the PI server or manually. Likewise, the source term component of RADDOSE uses plant specific radiological data, for a number of accident types, entered via the PI server or manually. Using this information along with EPA-400 dose conversion factors, the model determines dose rates, doses, deposition rates and total deposition.

URI is a computer code intended for use at nuclear generating stations and other emergency response facilities in the event of an actual or potential release of airborne radioactivity to the environment at levels warranting declaration of an Emergency specified in the Radiological Emergency Plan. URI is a replacement for the user interface normally delivered with the computer code Radiological Assessment System for Consequence AnaLysis ("RASCAL") maintained and distributed by the by the Nuclear Regulatory Commission (NRC).

The URI program:

- Provides a user interface specifically designed for users for nuclear power station events.
- Allows input of all required dose assessment model parameters including meteorological data, plant effluent monitor data, and plant condition and status.

- Develops source terms based on user input.
- Creates RASCAL data files based on the specific user input
- Invokes the RASCAL met data processor, plume model processor, and puff model processors.
- Reads and interprets RASCAL results files and provide reports to the user of doses, affected areas, and other information relevant to emergency plan implementation.

The code has three modes: Rapid Assessment, Detailed Assessment, and Sum Assessment. Rapid Assessment enables on-shift staff to meet regulatory requirements for quick, simplified dose assessments in the initial phases of an event. Detailed Assessment enables the Emergency Response Organization staff to make more detailed dose assessments. Sum Assessment adds multiple concurrent assessment results.

Because certain aspects of the interface must be site or unit specific, particularly the release pathways, separate programs are used for each unit, or when possible, multi-unit site if the units are identical. The majority of the code forms and modules are common to all these separate programs, with the pathways and site specific setup parameters different for each site / unit.

The program utilizes two types of data:

- User inputs
- Constants stored in external encrypted xml format files unique to each site.

User inputs are values needed to run dose assessments that vary from assessment to assessment. These would consist of items such as meteorological data and effluent monitor readings.

Constants are values set internally by the system administrators. These would consist of items such as site boundary distances and monitor response factors that define the site and do not change for each assessment. A separate computer program called "Interface Maintenance" is used to control and generate these constants and maintain the SQL data table files that these constants are stored in. The URI computer programs cannot change constant values or their related encrypted xml files.

The dose assessment computer programs will only be run when a user needs to perform a dose assessment. The code does not generate any data that needs to be retained by the program after an assessment is completed, though reports can be printed or saved to individual files for later retrieval if required.

There are no interfaces with plant safety systems.

The URI programs are specifically designed to interface with versions 4.0 to 4.2 of the NRC computer program RASCAL. It is expected that future revisions will remain compatible but would need to be verified for each new RASCAL release. RASCAL is designed to produce emergency release dose assessments. RASCAL communicates between its own separate modules (.exe and .dll modules) using ASCII text data files. The URI programs interface with RASCAL by creating the same data files in the same format based on the information stored in the xml data tables and the user input. These RASCAL data files are modified or retrieved 'on-the-fly' for each assessment performed.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☒ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

RJ 8/25/14

Impact and Licensing Basis Determination: **BLOCK 3**

10 CFR 50.47(b)(8) states: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained."

The emergency planning functions associated with 10 CFR 50.47(b)(8) state:

- Adequate facilities are maintained to support emergency response.
- Adequate equipment is maintained to support emergency response.

The applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E states (in part): Adequate provisions shall be made and described for emergency facilities and equipment, including:
2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.H.8 states:

Each licensee shall provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative current meteorological information from other sources.

10 CFR 50.47(b)(9) states: "Adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use."

The emergency planning function associated with 10 CFR 50.47(b)(9) states:

- Methods, systems and equipment for assessment of radioactive releases are in use.

The applicable supporting requirements which are described in 10 CFR 50, Appendix E state:

Section IV.B (in part):

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described,

Section IV.E (in part):

Adequate provisions shall be made and described for emergency facilities and equipment, including:

2. Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

The applicable informing criteria described in NUREG-0654, Section II.I states (in part):

8. Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment and estimated deployment times.

9. Each organization shall have a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} uCi/cc (microcuries per cubic centimeter) under field conditions. Interference from the presence of noble gas and background radiation shall not decrease the stated minimum detected activity.

The applicable informing criteria described in NUREG-0696, Section 4.8 states (in part):

The EOF technical data system will receive, store, process and display information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data providing information...

The EOF data set shall include radiological, meteorological, and other environmental data needed to:

- Assess environmental conditions,
- Coordinate radiological monitoring activities, and
- Recommend implementation of offsite emergency plans.

Licensing Basis:

This evaluation included a search of MNS licensing basis documents for references to Dose Assessment, and

specifically for references to RADDOSE-V. The search concluded that while the dose assessment function is discussed, specific references to the dose assessment tool and how to perform dose assessments are not discussed. As a result, the MNS licensing basis is not impacted by the change to replace RADDOSE-V with URI as the dose assessment tool. The change is which supports replacement of RADDOSE V with URI and is strictly administrative and does not affect the licensing basis.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

The replacement of RADDOSE with URI will continue to comply with applicable regulations and commitments by providing a means of assessing offsite radiation dose during an emergency.

Compliance with the requirements identified above is maintained in the following manner:

Item 1

URI uses plant effluent monitor values and meteorological instrumentation input for the calculation of dose assessment results. These results are then used to determine the environmental impact of radioactive material releases and to direct the activities of field monitoring teams in plume tracking. Licensee emergency response personnel also use the assessment results to make protective action recommendations to state and local authorities. These features of URI are consistent with the current capabilities of RADDOSE.

RADDOSE employs an automatic data download from selected meteorological and radiation monitoring instrumentation to make dose projections. Typically, these downloads occur at 15-minute intervals. The user performing the assessment is responsible for validating the downloaded information against current plant conditions. While URI has no provision for automatic data downloading, it does allow the user to "drag and drop" meteorological and radiation parameters into the fields used by the application. This does not result in a significant delay since most of the time spent for data input in both RADDOSE and URI is for data validation. Field syntax restrictions reject out-of-range data to prevent erroneous information from being used in projection calculations. This feature, coupled with continual validation by the user, minimizes the risk of incorrect data entry.

Item 2

The portion of this requirement pertinent to the proposed change is that the licensee provide the method to perform rapid radiological assessments.

RADDOSE uses a Gaussian dispersion model and employs dose conversion factors taken from EPA 400, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.* URI uses a similar model with the same dose conversion factors. Empirical comparisons of both applications yield similar dose projection results when subjected to the same radiological and meteorological conditions. Calculation time of both applications is approximately the same. In addition, RASCAL (the underlying calculational base of URI) is sanctioned by the NRC and accepted as an industry standard application for dose projection.

Item 3

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of how offsite dose projections are made. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

Item 4

The portion of this requirement pertinent to the proposed change is that the emergency plan will contain a description of the equipment used for assessing the impact of the release of radioactive materials to the environment. This description appears in Section I of the McGuire Nuclear Station (MNS) Emergency Plan.

The replacement of the Raddose-V dose assessment tool with URI involved rigorous testing and walkdowns to ensure the tool was ready for implementation. Duke Energy and the URI vendor performed a Validation and

Verification of the program to support implementation of the change. In addition, MNS ERO members qualified in dose projections received training on the changes and differences in dose projection methodology between RADDOSE-V and URI. This change to replace Raddose-V with URI does not change intent. This change supports the Duke Energy fleetwide initiative to replace the dose projection tool used for dose assessment and for protective action decision-making at all nuclear sites with an enhanced and improved methodology. The fleet procedure AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment" will now provide MNS dose assessment personnel with instructions for performing dose projections at the MNS site. The implementation of AD-EP-ALL-0202 ensures the correct software program for performing dose projections is used. This change continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

The change which supports the replacement of Raddose-V with URI is strictly administrative and continues to comply with planning standards, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E requirements.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:

The screening of the change from Raddose-V to URI identified two affected emergency planning functions associated with 10 CFR 50.47(b)(8) and 10 CFR 50.47(b)(9), as described above in the Impact and Licensing Basis Determination.

The change replaces RADDOSE with URI as the principal dose assessment tool. While the user interface for URI differs from that of RADDOSE, the assessment methodologies of both applications are essentially the same. Both employ the same dose conversion factors for determining source term dose. Both applications also use similar meteorological models of Gaussian plume dispersion.

URI provides a site specific overlay on the existing RASCAL meteorological, dispersion, and dose assessment models for all required input for emergency dose assessment as well as reports and plume graphics. Using the URI interface, the user does not interact with any part of the original RASCAL input or output screens.

Three of the primary purposes of URI are to make an interface that includes significant additional site specific processes (e.g. site specific effluent monitors), to simplify the input process for the user, and to use an industry common dose assessment model.

URI operates by providing a single input / result display form with non-serial input, and uses a 'pathway' release condition process rather than requiring the user to answer repetitive questions about the release. By selecting a 'pathway', options are set including default meteorological towers, release heights, applicable effluent monitors, etc. to limit the number of sequential questions the user must answer and to prevent selections that do not match. While all emergency effluent dose assessment systems require similar information (met data, isotopic mix, release magnitude), URI minimizes the effort required and significantly limits the opportunity for inappropriate selections. Options selections are defined for each specific pathway, which both prevent inappropriate selections and highlight to the user the available options for defining the engineered active and passive particulate and iodine removal processes that affect the mix appropriate for the selected pathway.

Numerous additional reports, data displays, etc. are provided for details when needed. Plume plots are provided, and a graphical display of areas exceeding the protective action guideline (PAG) limit is available. The PAG graphic can be based on either the standard 16 sectors and 3 distances or on geo-political emergency response areas.

One distinction between RADDOSE and URI deals with the identification of protective action recommendations (PARs). A feature of RADDOSE automatically flags the user when a dose projection determines that a PAR

threshold has been met. The user is then expected to refer to approved procedures to confirm the validity of this indication. Experience has shown that the automatic feature can be misleading under certain conditions and has led to incorrect PAR recommendations, particularly when the dose projection was performed by a less experienced user.

URI does not have this automatic flagging feature. PAR determination is made solely on approved procedural guidance without reliance on a potentially misleading indication.

Multiple options for source term basis are provided including monitored with single channel effluent monitors, monitored with multi-channel group monitors, or release point samples, and numerous unmonitored options including containment high radiation monitors, containment leakrate without monitors, RCS leakrate, or field team back calculation.

Three assessment methods are provided; a "Detailed" option for more experienced users, a "Rapid" option that makes more fundamental assumptions that is intended for immediate on-shift response, and a "Summation" option that allows for adding multiple concurrent releases. While the "Detailed" and "Rapid" options are consistent with current RASCAL assessment modes, the "Summation" option is an enhancement resulting from Fukushima experience.

The URI application, using site-specific inputs, has been evaluated against the software quality assurance criteria of NSD-800. Comparison of test cases for RADDOSE and URI show consistently satisfactory results. The two applications showed no significant difference in the timeliness or accuracy of dose assessment information.

In summary, URI is characterized by:

- a user-friendly input interface,
- graphical overlays displaying projected plume paths and dose values,
- the ability to perform dose projections using multiple simultaneous releases, and
- wide acceptance by both the industry and the NRC as an effective dose assessment application.

The change does not result in a reduction in effectiveness of facilities, response organizations, or response equipment. This change is strictly administrative and does not change intent. This change supports the replacement of the RADDOSE dose assessment tool with Unified RASCAL Interface (URI). This change does not affect the timeliness, accuracy or capability to determine or process dose projections and supports a fleetwide initiative to align dose assessment tools at all Duke Energy nuclear plant sites.

This change does not affect the emergency planning functions associated with 10 CFR 50.47(b)(8), because this change continues to ensure that adequate facilities and equipment are maintained at MNS to support emergency response, including equipment used for performing dose projections. This change does not affect the applicable supporting requirement which is described in 10 CFR 50, Appendix E.IV.E, because this change continues to ensure that adequate provisions shall be made and described for emergency facilities and equipment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.H.8.

This change does not affect the emergency planning function associated with 10 CFR 50.47(b)(9), because the change continues to ensure that methods, systems, and equipment for assessment of radioactive releases are in use at MNS. This change does not affect the applicable supporting requirement described in 10 CFR 50, Appendix E.IV.B and E, because this change continues to ensure that equipment is available for determining magnitude and assessment of releases to the environment. In addition, this change continues to meet informing criteria described in NUREG-0654, Section II.I (8-9) and NUREG-0696, Section 4.8.

As stated above, this change does not reduce the effectiveness of the MNS Emergency Plan. Instead, the change described in this revision continues to provide additional assurance that the ERO has the ability and capability to:

- respond to an emergency;
- perform functions in a timely manner;

- effectively identify and take measures to ensure protection of the public health and safety; and
- effectively use response equipment and emergency response procedures.

This change enhances ERO readiness to support a classified emergency, resulting in an improved capability to ensure health and safety of plant personnel and the general public. This change continues to meet NRC requirements, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

This change is an overall improvement to the MNS Emergency Preparedness Program.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/25/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 10-22-14
Approver Name: Kevin L. Murray	Approver Signature	Date: 11-11-14

Activity Description and References: MNS EPLAN Change 14-~~4~~ 5, Section Q, Appendix 3, Alert and Notification System Description 10/9/14 BG — **BLOCK 1**

Activity Scope: — **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: — **BLOCK 3**	**Change Type:** — **BLOCK 4**
☒ The change is editorial or typographical	☐ The change does conform to an activity that has prior approval
☐ The change is not editorial or typographical	☐ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: — **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☐ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☐ §50.47(b)(8) – Emergency Facility and Equipment
☐ **§50.47(b)(9) – Accident Assessment***
☐ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☐ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☒ The proposed activity does not impact a Planning Standard

This change corrects a reference to a note. The note is located on Page Q-12, in the table that describes periodic testing of sirens. The correction changes a reference in the Growl Test section of the chart on Q-12 from "Note 4" to "Note 3". The note became Note 3 as a result of a previous plan change to this section (EPLAN Change 14-3, which delete a note. The notes were subsequently renumbered but the note reference was not changed. This change does not alter the frequency nor content of siren tests.

Commitment Impact Determination: — **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Results: **BLOCK 7**

☒ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☐ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Renard Burris		10/9/14
Reviewer Name: Marc Mulkey	Reviewer Signature	Date: 10/22/14

§50.54(q) Screening Evaluation Form **Activity Description and References: MNS Emergency Plan Section Q (Appendix 3, Alert and Notification System) Rev 14-5 December 2014**

BLOCK 1

Page Q-11 Changed from "Selective Signaling" to "DEMNET".

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, includes information on how to operate DEMNET.

DEMNET was incorporated to remove the Selective Signaling System and on the use of the new communication network, for making emergency notifications to off-site agencies by initiating group calls to the government agencies using DEMNET "MSN Notify".

Planning Standards 50.47(b)(5) and 50.47(b)(6), are impacted by the new DEMNET process therefore a 10CFR50.54(q) Effectiveness Evaluation must be performed.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type:	**BLOCK 3**	**Change Type:**	**BLOCK 4**
☐ The change is editorial or typographical ☒ The change is not editorial or typographical		☐ The change does conform to an activity that has prior approval ☒ The change does not conform to an activity that has prior approval	

Planning Standard Impact Determination: **BLOCK 5**

- ☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
- ☐ §50.47(b)(2) – Onsite Emergency Organization
- ☐ §50.47(b)(3) – Emergency Response Support and Resources
- ☐ **§50.47(b)(4) – Emergency Classification System***
- ☒ **§50.47(b)(5) – Notification Methods and Procedures***
- ☒ §50.47(b)(6) – Emergency Communications
- ☐ §50.47(b)(7) – Public Education and Information
- ☐ §50.47(b)(8) – Emergency Facility and Equipment
- ☐ **§50.47(b)(9) – Accident Assessment***
- ☐ **§50.47(b)(10) – Protective Response***
- ☐ §50.47(b)(11) – Radiological Exposure Control
- ☐ §50.47(b)(12) – Medical and Public Health Support
- ☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
- ☐ §50.47(b)(14) – Drills and Exercises
- ☐ §50.47(b)(15) – Emergency Responder Training
- ☐ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: _____

☒ The activity does not involve a site specific EP commitment

Screening Evaluation Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature	Date:
Randy Gibson		9/23/14
Reviewer Name:	**Reviewer Signature**	**Date:**
Marc Mulkey		10/22/14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: MNS Emergency Plan, Section Q (Appendix 3, Alert and Notification System Description) rev 14-5 December 2014 | **BLOCK 1**

Page Q-11 Changed "Selective Signaling to "DEMNET"

To support a Duke Energy fleetwide initiative, replacing references and instructions associated with Selective Signaling to Duke Emergency Management Network (DEMNET) which is used for notifications to state/county agencies.

The Selective Signaling to DEMNET replacement work is being performed under Engineering Change (EC)# 112636.

New Fleet procedure, AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET), Revision 0, will also be issued. The new Fleet procedure includes information on how to operate DEMNET.

DEMNET changes were incorporated to remove the Selective Signaling System and add instructions on the use of the new communication network, DEMNET. Step details for using the old Selective Signaling system were deleted or replaced with instructions for using DEMNET. Step details for using DEMNET include the following: Initiating group calls to the government agencies with the DEMNET "~~MGN~~ Notify" button, use of the Alternate DEMNET buttons, and notes containing supplemental information. MNS KLM 10-28-14

Additional information regarding this change:

The Selective Signaling emergency communications system has been the primary method of prompt communication to State and local Offsite Response Organizations (OROs) from the McGuire Nuclear Station (MNS) for many years. Within the confines of MNS, Selective Signaling operates as part of the normal plant communications system (i.e. internal extensions, commercial phones, etc.). Beyond the boundaries of MNS, Selective Signaling transmits over analog lines that are leased from local telephone providers. In the past, these lines have been subject to damage by natural and man-made causes or other failures such that all or part of communication ability of MNS to or from some or all of the OROs via Selective Signaling has been lost for various periods of time.

Since Selective Signaling is an unmonitored system, it is typically not known that problems exist until the system is used (i.e., during periodic testing, communication checks, drills, etc.). When problems are identified and reported, it is up to the local telephone provider to determine when the repair(s) can be made. In addition to the less than reliable service for the Selective Signaling system, Duke Energy has been notified by local telephone providers that due to the frequency of failures and the ever increasing difficulty in obtaining repair parts / materials, they will no longer be able to provide repair / maintenance support of the antiquated system beyond 2014.

As a solution for this, Duke Energy has selected Emergency Management Network (EMnet) as provided by the vendor, Communications Laboratories (Comlabs). EMnet is currently in use by a number of Federal, State, and local government agencies, and is being implemented by an increasing number of nuclear stations / utilities. EMnet will be referenced as DEMNET for the remainder of this evaluation. Comlabs provides hardware, software, training, installation and other services necessary for DEMNET to operate. DEMNET is being implemented across the Duke Energy Fleet as a replacement for Selective Signaling.

DEMNET allows the Control Room, Technical Support Center (TSC), Emergency Operations Center (EOF), and alternative response facilities to communicate with Offsite Response Organizations and/or with each other using VoIP (voice-over-internet protocol) as the primary method. In the event of internet related problems (i.e., slow data transfer rate, unavailability, etc.), the system automatically transfers to satellite communication as a backup. Like Selective Signaling, DEMNET allows internal and external point-to-point contact between individual stations as well as simultaneous conferencing with multiple stations. This ability is a valuable backup to existing telephone circuits. The point-to-point capability also allows DEMNET to continue to provide Decision Line capability, which enables ORO

decision makers to use the system to discuss public protective actions over dedicated / controlled access communication links.

Via the dedicated DEMNET computer, historical and real-time system status can be readily determined. DEMNET is also monitored by the vendor, Comlabs. This allows for a more proactive approach in identification and resolution of problems associated with the system should they occur. In the event of failure, the application of suitable compensatory measures (i.e., use of back up communications) can be made in a more efficient and effective manner.

No changes are made to the communications systems that currently serve as a backup to Selective Signaling or the associated implementation process(es) for employing them.

DEMNET equipment installed and operated at Duke Energy nuclear plants and support facilities is installed and maintained to meet cyber security requirements in accordance with 10 CFR 73.54 and other related guidance.

As part of the installation process, DEMNET has been extensively tested to ensure connectivity / operability before being placed in service. Duke Energy Emergency Response Organization and Emergency Preparedness, along with personnel from Offsite Response Organizations have received training on the new system as well.

As configured, the network that DEMNET resides within MNS causes the system to be powered from various sources based upon the physical location of the individual components within the network. In the event normal and/or backup power supplies become unavailable, and as a result, DEMNET and all other backup communications system become non-functional, MNS and the OROs have a number of battery powered portable satellite phones available that can be placed into service in an effort to maintain the capability of providing prompt communications between MNS and the OROs.

Upon implementation across the Duke Energy Fleet and its State and local Offsite Response Organizations, the product name "EMNet" is replaced with the new system name "Duke Emergency Management Network (DEMNET)". The name "Selective Signaling" will no longer be used, while the name "Decision Line" will continue to be used.

Activity Type: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*
☐ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: **BLOCK 3**

- 10 CFR 50.47(b)(5) - Notification Methods and Procedures (Risk Significant Planning Standard) states: "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

  The applicable emergency planning function associated with 10 CFR 50.47(b)(5) states: "Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications."

- 10 CFR 50.47(b)(6) – Emergency Communications states: "Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

  The applicable emergency planning functions associated with 10 CFR 50.47(b)(6) state:

- Systems are established for prompt communication among principal emergency response organizations.
- Systems are established for prompt communication to emergency response personnel

Licensing Basis:

This evaluation included a search of McGuire Nuclear Station (MNS) licensing basis documents for references to the Selective Signaling system. The search concluded that a review of the Duke Energy McGuire Nuclear Station (MNS) Emergency Plan was warranted.

While the MNS Emergency Plan contains several references to Selective Signaling, there are no details within the Emergency Plan regarding usage of the system, other than to indicate that it is the primary system used for prompt communications to the offsite response organizations. DEMNET is replacing Selective Signaling as the primary system used for prompt communications to the offsite response organizations.

Other references within the MNS Emergency Plan include facility diagrams which indicate the location of Selective Signaling telephones. DEMNET equipment is replacing Selective Signaling in each location where Selective Signaling was present.

The MNS Emergency Plan also references periodic testing of Selective Signaling. DEMNET will be tested in a similar manner and frequency as was Selective Signaling.

Consequently, the replacement of the Selective Signaling system with DEMNET within the MNS Emergency Plan will constitute a name change only.

This review concludes that changes to this document relative to the replacement of Selective Signaling with DEMNET do not affect the licensing basis of the MNS Emergency Plan. The changes in this revision support replacement of the Selective Signaling telephone system, which is used for notifications to state/county agencies, with a new dedicated telephone system called the Duke Emergency Management Network (DEMNET). These changes support a Duke Energy fleet-wide initiative to upgrade the dedicated telephone system for notifying state/county agencies of a declared emergency as an overall enhancement to emergency preparedness. These changes meet or exceed all emergency preparedness requirements based on NRC regulations and requirements.

Compliance Evaluation and Conclusion: **BLOCK 4**

1. Evaluation:

10 CFR Part 50, Appendix E, Section IV.D.1 states the following:
Administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary, shall be described. This description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs.

10 CFR Part 50, Appendix E, Section IV.D.3 states the following, in part:
A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate ...

10 CFR Part 50, Appendix E, Section IV.E.8.d states the following, in part:
For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: ... the capability to perform offsite notifications; ....

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 2.7, states, in part:
The TSC voice communication equipment shall include:

- Hotline telephone ...
- Dedicated telephone ...
- Dial telephones ...
- Intercommunications systems ...

- Communications ... to State and local operations center prior to EOF activation.

NUREG-0696 (Functional Criteria for Emergency Response Facilities), Section 4.6, states, in part:
The EOF shall have reliable voice communications facilities to the TSC, the control room, NRC, and State and local emergency operations centers. The normal communication path between the EOF and the control room will be through the TSC. The primary functions of the EOF voice communications facilities will be:

- EOF management ...
- Communications ...
- Communications ...
- Communications to coordinate offsite emergency response activities, and
- Communications ... .

NUREG-0654 (Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants), Section II.F, states, in part:

1. The communications plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local, and State response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:

   a. provision for 24-hour per day notification to and activation of the State/local emergency response network; and at a minimum, a telephone link and alternate, including 24-hour per day manning of communications links that initiate emergency response actions.

   b. provision for communications with contiguous State/local governments within the Emergency Planning Zones;

   c. provision for communications ...

   d. provision for communications ...

   e. provision for alerting or activating emergency personnel in each response organization; and provision for communication ...

The replacement of Selective Signaling and Decision Line (SS/DL) with DEMNET continues to comply with applicable regulations and commitments by providing a dedicated method of contacting State and local authorities in a timely manner during an emergency.

Compliance is maintained in the following manner:

1. DEMNET is a dedicated system for communication with OROs that is capable of establishing contact within 15 minutes of emergency declaration. This is consistent with the capability of the SS/DL system.

2. DEMNET stations are present in the Control Room, TSC, EOF, and alternative facilities which are capable of initiating or receiving point-to-point or conference calls with any ORO site similarly equipped. This is consistent with the capability of the SS/DL system.

3. Compatible DEMNET stations are installed in all ORO locations that were serviced by the SS/DL system.

4. The TSC has an DEMNET station to allow communication with State and local OROs prior to EOF activation. This capability existed with the existing SS/DL system.

5. DEMNET is a voice communications system with dedicated stations located in the Control Room, TSC, EOF, alternative facilities, and State/local emergency operations centers and is capable of coordinating offsite response activities via point-to-point or conference calling. Communications with NRC is

conducted using a separate system unrelated to DEMNET. This is consistent with the SS/DL system.

NOTE: In addition to voice communications, DEMNET is also capable of transmitting data. The voice communications feature of DEMNET is the replacement for SS/DL voice communications capability.

6. DEMNET has redundant features to maintain communication capability in the event of system failure or degradation. During normal operation, DEMNET employs voice-over-internet protocol (VoIP) technology
to establish contact between stations. Should internet problems (unavailability, slow transfer rate, etc.) occur, the system will automatically shift to satellite communication as a backup. This backup feature is an enhancement that SS/DL did not have. Failure of the SS/DL system required the use of the commercial telephone system to re-establish communications.

7. By locating an DEMNET station in the continuously staffed Control Room, the licensee provides 24-hour per day capability to establish links to initiate emergency response actions.

8. DEMNET stations are established at each contiguous State/local emergency response agency within the EPZ. This is consistent with the usage of the SS/DL system.

- 10 CFR 50.47(b)(5) states the following:

"Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established."

The function of this planning standard pertinent to this change is the establishment of procedures for State and local governmental agencies that are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

- 10 CFR 50.47(b)(6) states the following:

"Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public."

The function of this planning standard pertinent to the change is that systems be established for prompt communications among principal response organizations.

Conclusion:

The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: **BLOCK 5**

1. Evaluation:
The screening of this change has identified two (2) affected planning standard functions described above:

1. Procedures for notification of State and local government agencies are capable of initiating notification of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.

Additional procedures are currently in effect for notification of State and local agencies following a declared emergency. These procedures explicitly require that such notification occur within 15 minutes of emergency declaration.

Station procedures were originally intended to address notifications using the Selective Signaling/Decision Line (SS/DL) system and have likewise been revised to address the change to

DEMNET. The functionality and utility of the procedures remain unaffected by the proposed change. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

2. Systems are established for prompt communication to emergency response personnel.

   The SS/DL system suffered from obsolescence and eroding vendor support. The communications carriers currently providing service for the system informed the licensee that all support will terminate at the end of 2014. This prompted the change to DEMNET, a communications system widely used in the emergency response community.

   As described above, DEMNET possesses all of the capabilities of SS/DL with additional enhancements not found in the former system. Significant among these is the use of robust VoIP technology and automatic "failover" to satellite communications in the event of a failure or degradation of the primary internet flowpath. Consequently, this evaluation concludes that the change presents no undesirable impact on this planning function.

   The evaluation concludes that the change does not impact either applicable planning function negatively and therefore does not constitute a reduction in effectiveness.

Conclusion:

The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results **BLOCK 6**

☒ The activity does continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity does not constitute a reduction in effectiveness. Therefore, the activity can be implemented without prior approval.

☐ The activity does not continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity does constitute a reduction in effectiveness. Therefore, the activity cannot be implemented without prior approval.

Preparer Name: Randy Gibson	Preparer Signature	Date: 9/23/14
Reviewer Name: Marc Mullen	Reviewer Signature	Date: 10/22/14
Approver Name: Kevin L. Murray	Approver Signature	Date: 11-11-14